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Evaluation of the Florida Water Supply Program

Environmental Protection Agency, Atlanta, Ga

1973

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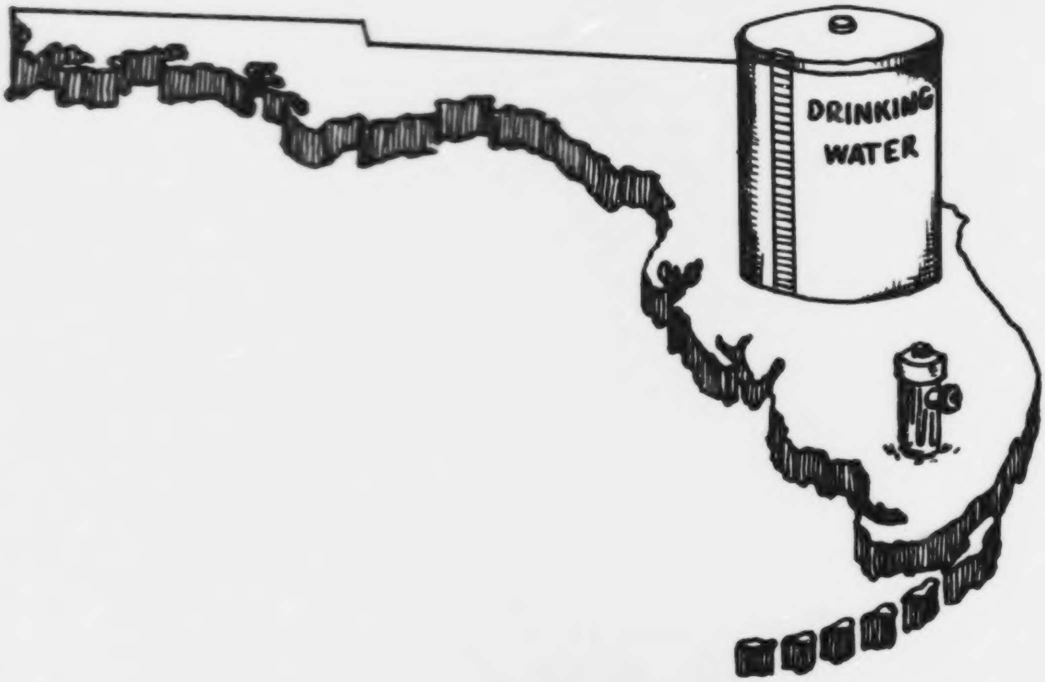
EVALUATION

# of the

FLORIDA WATER SUPPLY PROGRAM



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EVALUATION

# of the

FLORIDA WATER SUPPLY PROGRAM

WATER SUPPLY BRANCH
OFFICE OF WATER PROGRAMS
ENVIRONMENTAL PROTECTION AGENCY

REGION IV
ATLANTA, GEORGIA

PREFACE

The Environmental Protection Agency has conducted an evaluation of the Florida Water Supply Program. This report presents the findings, conclusions, and recommendations, with supporting data and explanatory text, resulting from this evaluation.

The information contained herein is presented in condensed form and the significance is further discussed in a companion report EVALUATION OF THE FLORIDA WATER SUPPLY PROGRAM - SUMMARY. The SUMMARY highlights important findings and principal recommendations for those who have an interest in Florida's drinking water but do not wish to study the details of the complete report.

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SUMMARY OF FINDINGS AND CONCLUSIONS

The health of over 7.5 million people in Florida is directly dependent upon the safety of their drinking water. Dr. Wilson T. Sowder, Director, Florida Division of Health, recognized this and expressed concern over the adequacy or effectiveness of drinking water regulatory efforts in the State. Dr. Sowder further suggested that the Florida Water Supply Program could benefit from an independent evaluation, and requested that the Environmental Protection Agency evaluate the Division's program for health surveillance of drinking water. The requested evaluation was conducted during the second half of calendar year 1973, and this report presents the Environmental Protection Agency's findings, conclusions, and recommendations, with supporting data and explanatory text.

Approximately 6.3 million residents of Florida are served by community water supply systems. While the number of such systems is not accurately known, the Bureau of Sanitary Engineering of the Florida Division of Health has estimated that there are 1800 supplies serving 25 or more residents, with these supplies generally being termed "public" supplies. The Bureau also estimates that there are [illegible]000 systems which serve more than one household but fewer than 25 residents and/or make water available to the non-resident public. These numerous smaller systems, such as restaurants, camps, service stations, small trailer parks, etc., have full status as public supplies under Statute and Regulation. However, their number has precluded their inclusion in the full State surveillance program, and for this reason, they will be treated separately in this report and termed "small public" supplies. It is also estimated that at least one million residents obtain drinking water from private, single family systems.

The effectiveness of the Florida Water Supply Program was judged primarily on the bases of drinking water quality, adequacy and condition of water system facilities, and the level of surveillance found during a field evaluation of actual supplies. Thirty (30) public and 78 small public supplies, selected to provide a cross-section of water supply practice in Florida, were studied. These public systems serve approximately 1.5 million residents and it is estimated that as many as 920,000 residents and travelers may drink from the 78 small public supplies each year. Rural, individual water supply systems are beyond the scope of this evaluation.

WATER SUPPLY STATUS

The following summary presents the principal findings of the field evaluation of selected public water supplies. Widespread departures from acceptable standards of waterworks practices are documented.

Water Quality - Bacteriological

Thirty-three (33) percent of the public water systems examined did not meet bacteriological quality standards one or more months of the 12-month evaluation period. These systems serve approximately 34,110 people. Insufficient data existed to adequately determine bacteriological quality an an additional 37 percent of the public water systems serving an additional 102,173 people.

Three (3) percent of the 78 small public systems examined showed unsatisfactory bacteriological quality in the single sample collected and analyzed during this study. It is estimated that as many as 63,275 people (State residents and the traveling public) may drink this water during a year.

Water Quality - Chemical

All public water systems examined met mandatory chemical drinking water standards.

Six (6) public water supply systems serving approximately 7,250 people failed to meet recommended (aesthetic) chemical standards.

Thirty-six (36) percent of the small public water supplies failed to meet recommended chemical standards. As many as 236,000 people may be exposed to this water annually. Eight (8) small public water systems in Polk County evidenced radiation levels for which the Standards prescribe more thorough investigation and evaluation.

With regard to water system fluoridation operations, all fourteen systems surveyed needed improvement in at least one aspect of their program. Only six of the systems were found to have distribution system fluoride levels within the range recommended by the Division of Health.

Facilities and Operation

Seventy (70) percent of the public systems needed additional treatment facilities.

Thirty-seven (37) percent of the public systems needed important changes in operation of present facilities.

Thirty (30) percent of those systems which have equipment to chlorinate or which purchase and redistribute chlorinated water failed to maintain chlorine residual in all parts of the system.

Forty-seven (47) percent of the systems had inadequate distribution storage.

Operator Competence

Twenty-seven (27) percent of the public water systems had operators who were not full-time employees or who also operated other scattered systems.

Fifty-three (53) percent of the public systems were not maintaining and submitting adequate operational records and/or conducting adequate water quality testing.

Surveillance

Seventy (70) percent of the systems failed to meet bacteriological surveillance standards one or more months from July 1972 through June 1973.

Forty-seven (47) percent of the systems had not been inspected by a representative of the Florida Division of Health during the previous 12-month period.

Fifty-seven (57) percent of the systems had received a chemical analysis during the past three years. However, in most cases, the analyses did not include many of the 26 constituents listed in the Drinking Water Standards.

WATER SUPPLY PROGRAM

This study has concluded that staff limitations and inadequate program procedures have prevented the Florida Water Supply Program from fulfilling its responsibilities to those who drink water from public supplies in the State. Important activities relating directly to public health protection are not being performed in a timely and thorough manner or are not being performed at all. Sufficient staff for a fully satisfactory program has never been available. Added personnel, however, will not completely satisfy program deficiencies. The current Water Supply Program does not adequately protect public health and may foster a false sense of security regarding the safety of water supplies in the State.

Statutory and regulatory authority, from a legal standpoint, appear adequate for satisfactory operation of a program for health protection of drinking water. However, Water Supply Program field personnel generally reported ineffectiveness or inaccessibility of legal enforcement procedures. Provisions for enforcement of Rules and Regulations are not quickly responsive, and demands on legal staff often exceed available manpower to such a degree that legal procedures are not attempted.

Neither the Statute nor the Rules set forth the intent or establish procedures to assure comprehensive planning for orderly development and expansion of public water supply systems. The present plan review program works to this end, but has not succeeded in all cases to prevent the proliferation of small, difficult to regulate systems.

Annual Reports of the Division of Health have documented rapid increases in the number of public water supplies and the people served by these supplies. The same Annual Reports continually reported that the Water Supply Program had no choice except to sacrifice certain essential public health surveillance activities over these supplies because resources were not adequate for the work. Staff of the Water Supply Program has grown little during the past fifteen years, and although budgetary support has increased, much of the increase was absorbed by inflation of salaries and operational costs. This study has documented many deficiencies in the staff.

resources, and activities of the Water Supply Program, and many public water systems throughout the State present a health risk to the public. Expanded funding, staff, and program redirection and re-vitalization are all essential to enable the Florida Water Supply Program to attain full effectiveness and to meet its responsibilities.

Engineering review of bacteriological surveillance data has not been rigorous or consistent. In many instances, prompt remedial or corrective actions could not be documented. Interpretation of data has not been in accordance with official program quality standards. The present bacteriological surveillance system, even if all steps are performed with minimum delay, responds too slowly for satisfactory protection of public health.

Recent technical policy decisions by the Bureau of Sanitary Engineering have required many public supplies to adopt or plan for more conservative public health protection measures. These policies are generally supported by the Environmental Protection Agency. However, certain of these policies are not supported by all Water Supply Program professional staff, and implementation may be hindered by this.

Staff limitations and the press of other work have caused the Water Supply Program to partially abandon hopes for an adequate field surveillance and regulation activity. In addition, performance of some engineering surveillance activities is so hurried as to compromise its effectiveness. Program activities carried out in an inconsistent manner may promote a false sense of security.

Bacteriology and chemistry laboratory support is essential to the Water Supply Program. State and County Health Department bacteriological laboratories, together with utility laboratories, adequately handle present work volume. Fully satisfactory service, however, is limited in many cases by the 5-day work week of the laboratories. Chemistry laboratory service in the State laboratory is not presently equipped for high volume and few analyses are made for constituents of health significance.

The immense quantity of data generated by the bacteriology and chemistry laboratories and the engineering field surveillance data needs more timely, thorough analysis. Late or absent data needs to be recognized. Automatic data processing techniques offer many advantages for this type task.

In summary, the Florida Water Supply Program is not providing the health evaluation and engineering services necessary to fulfill its responsibilities to those who drink water in the State. To provide such necessary services, the following recommendations are made.

RECOMMENDATIONS

It is recommended that:

1. The Water Supply Program upgrade bacteriological surveillance through the following:
   - a. Renewed committment to the bacteriological surveillance and quality requirements of the existing Division of Health Rules;
   - b. Establishment of routine bacteriological surveillance over all public water supplies as required by the Rules. All official samples should be properly collected and analyzed in State laboratories or laboratories certified by the State;
   - c. Formulation and universal adoption of procedures to consistently review compliance with the standards, both with respect to numbers of samples and to quality;
   - d. Formulation and universal adoption of procedures to assure immediate notification and response to unsatisfactory water quality and early detection of supplies which have not submitted samples;
   - e. Extended laboratory services; and
   - f. Development and implementation of automatic data processing techniques for analysis and storage of bacteriological data.

2. The Water Supply Program improve and expand engineering surveillance of public water supply systems. Surveillance should include, but not necessarily be limited to:

a. Engineering review of plans and specifications for all new or modified water system facilities for compliance with Division policy, public health protection, and compatibility with recognized plans for orderly development of water systems;

b. Sufficient field inspection of construction to assure compliance with approved plans and specifications, or procedures to assure that the design engineer certifies construction was in compliance with plans;

c. Complete, thorough sanitary surveys of each system at least on an annual basis. Simple field inspection forms should be devised and used to provide a permanent record of the inspection and give the water supply officials written notice of deficiencies and recommendations;

d. Timely, thorough review of monthly operational reports with consistent follow-up on missing or questionable reports;

e. Timely, thorough review of chemical surveillance data.

3. Statutory authority for the Water Supply Program be augmented to enable rapid application of legally enforceable procedures

against a violator of the Division's Rules. Access is also needed to civil courts with penalties commensurate to the seriousness of public health risks and comparable to penalties available to other Florida environmental programs. Promotion of public welfare should be added as a legitimate purpose of the Water Supply Program.

4. The Bureau of Sanitary Engineering reorganize and supplement the Jacksonville Water Supply Program staff, forming two Sections. One Section should be principally responsible for review and approval of plans and specifications and related duties and the other Section principally responsible for maintaining engineering surveillance and monitoring of water system operation.

5. The Division of Health chemistry laboratory be expanded to include capability to analyze for all constituents listed in State and Federal Drinking Water Standards on a volume basis. Routine analysis for all constituents should be provided all public water supplies on a regular schedule.

6. Cooperative approaches continue to be emphasized in obtaining compliance with the Division's Rules and policies. However, if these measures fail, continued and expanded use of legally enforceable procedures should be undertaken, and more legal staff time should be made available.

7. Surveillance of small public water supplies be coordinated and directed by the Water Supply Program with the assistance of the County Health Departments. Small public supply surveillance should include preparation and maintenance of a complete inventory, bacteriological and chemical surveillance, and consistent field inspections by trained personnel.

8. Policies, guidelines, and procedures established by the Division for system design, operation, and surveillance be compiled and made available to field personnel of the program and to other appropriate water industry personnel.

***

In order to fully implement the above, it is recommended that:

9. Professional staff of the Water Supply Program be immediately increased by at least 15 positions. Further phased increases in Water Supply Program staff are recommended which will add 26 additional professionals over a 3-year period. Budgetary support should be increased from about $369,200 in FY 74 to about $1,356,200 in FY 78.

10. Bacteriological laboratory capability to support drinking water surveillance be expanded to handle approximately 345,000 samples per year, an increase of approximately 165,000 over the 180,000 reportedly analyzed in 1972. The additional workload, to be

distributed among 22 State and County Health Department laboratories, is estimated to require an additional expenditure of approximately $495,000 over the estimated $540,000 spent in 1972.

11. Chemistry laboratory capability to support the Water Supply Program be increased through addition of analytical equipment, laboratory space, and personnel. It is estimated that at least $135,000 will be initially needed annually for adequate chemistry laboratory services.

12. Water Supply Program field surveillance activities be facilitated by establishment and staffing to two additional Regional Offices. Fort Pierce and Tallahassee are suggested as possible locations.

13. The Water Supply Program prepare a comprehensive inventory of all public and small public water systems in Florida, including such pertinent information as source, treatment, population served, ownership, and person in responsible charge. Means should be provided for periodic updating.

INTRODUCTION

This evaluation was conducted to determine the effectiveness of the Florida Water Supply Program, and to recommend such improvements as may be needed to assure safe, wholesome drinking water for the residents of Florida. Specifically, this evaluation attempted to ascertain the present condition of public water supply operations in Florida, especially conditions relating to safety and reliability of the supplies. The adequacy of the Water Supply Program's legal basis, budget, manpower resources, regulations and policies, and surveillance activities was examined. The effectiveness of the Water Supply Program was interpreted in light of the condition of the State's supplies, and recommendations are submitted for needed improvements.

BACKGROUND

The relationship between environment and disease came into focus in the early years of the twentieth century and the first environmental health programs were established. The U. S. Public Health Service investigated Florida public health programs in 1916 at the request of the State Health Officer, and included among its recommendations the creation of a Bureau of Engineering. This recommendation was implemented, and George W. Simons, Jr. became Bureau Director. Mr. Simons served until 1925 and is credited with successfully promoting legislation upon which current programs are based.

A succession of directors and reorganizations characterized the 1930's until David B. Lee was appointed Director in 1941. Except for several years during World War II, he served until [illegible] when the present Director, Sidney A. Berkowitz, was named.

Rapid wartime and post-war population and industrial growth brought to Florida some of the environmental problems which characterize more fully developed areas. Stream sanitation and waste treatment activities grew during the 1950's, and the air pollution control program was added to the Bureau in 1959. These and other environmental programs received public and legislative support and grew in proportion to the Water Supply Program. In the late 60's and early 70's, reorganizations of State government resulted in the transfer of many environmental programs out of the Division of Health, with attendant loss of personnel and facilities formerly available to the Water Supply Program. The present Bureau of Sanitary Engineering includes water supply, swimming pools and natural bathing areas, and shellfish sanitation activities.

SCOPE

WATER SUPPLIES IN FLORIDA

According to the University of Florida, 7,440,000 persons resided in the State in 1972. Approximately 6,300,000 of these people are served by public water supply systems estimated to number at least 1800. In addition to these, an unknown but tremendous number of Florida residents and out-of-state travelers (perhaps as many as 50,000,000 persons annually) may drink water supplied by an estimated 5000 small public systems serving visitors at restaurants, campgrounds, recreational facilities, residents at small trailer parks, subdivisions, and similar establishments.

Division of Health Rules broadly define "Public Water Supply System" as "a system serving more than 25 persons or otherwise making water available to public groupings or the public in general, including the works and auxiliaries for collection, treatment, storage, and distribution of water from a source or sources of supply to the free-flowing outlet of the ultimate consumer." In accordance with this wording and current interpretation by the Bureau, all water supplies available to the public are "public" with individual home water systems being the only type of water supply system excluded. It has been determined, however, that authority does not exist to extend plan review and approval to supplies serving fewer than 25 residents, and State level surveillance of these small supplies has not been widely pursued.

Over one million Florida residents use individual home systems for domestic water needs. These systems are not included in the present Water Supply Program, and are beyond the scope of this evaluation.

WATER SUPPLIES STUDIED

Through discussions with Bureau of Sanitary Engineering personnel, it was agreed that the study would generally follow procedures used in State Water Supply Program Evaluations performed in other states.

It was agreed that investigation of a representative number of water supplies was sufficient to judge the effectiveness of the Florida Water Supply Program. A sample of all types of public water supplies was selected for study. The technique used for selection of the study sample was not intended to provide a perfect random sample. However, the results are considered to reasonably represent water supply practice in the State.

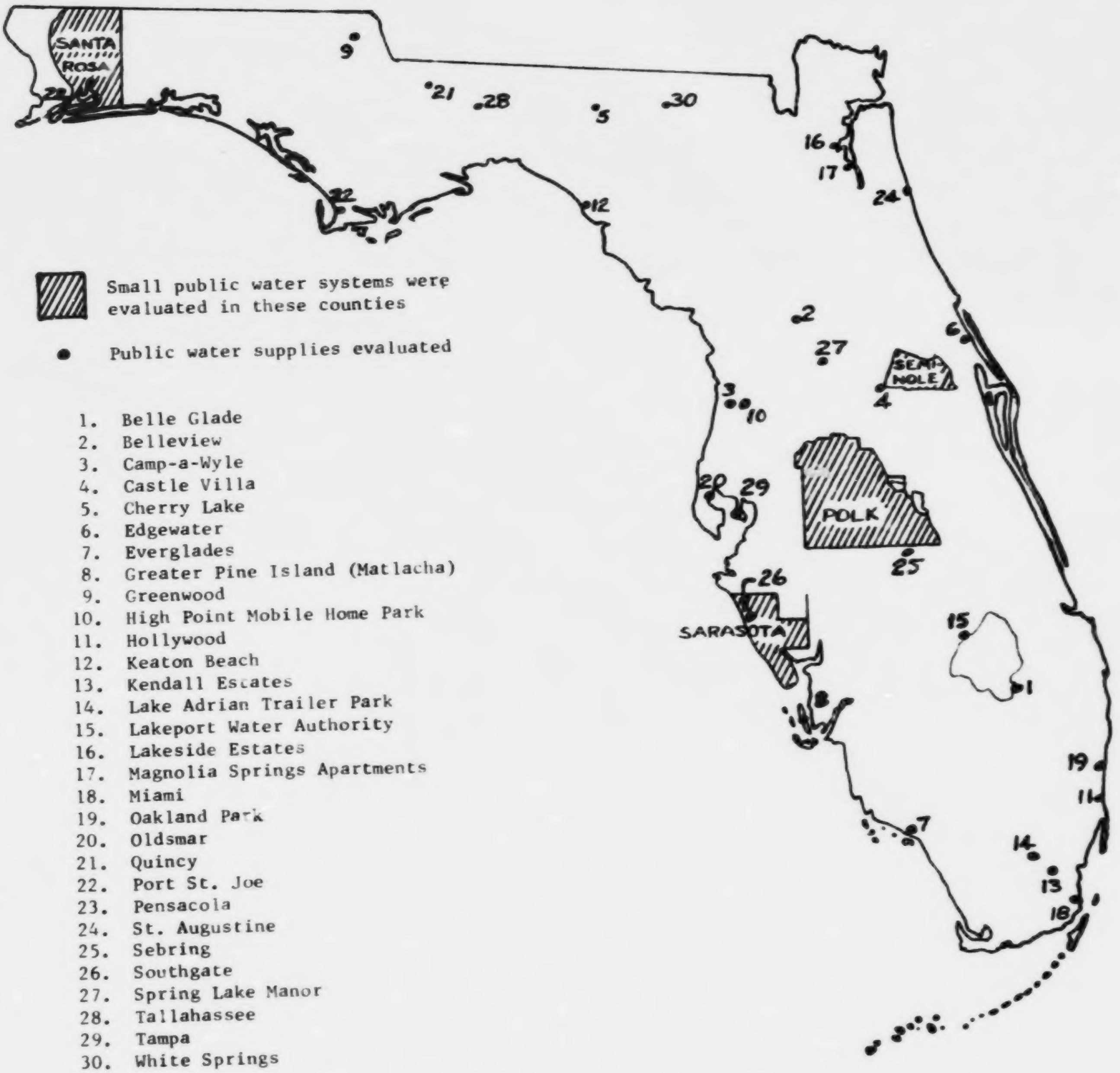
Thirty (30) public water supplies were selected to include a wide range of size, types of source, methods of treatment, geographical location within the State, and ownership. These 30 systems provide a fair cross-section ot water supply practice by systems under the surveillance of the State Water Supply Program. It is estimated that these systems serve approximately 1,500,000 people or about 24 percent of those served by public water supplies in Florida. Five (5) of the systems provide drinking water to commercial carriers operating interstate. The number of interstate travelers so served is unknown. Technical data on the systems surveyed is tabulated in Appendix A and their location is shown in Figure 1.

Two (2) of the 30 supplies selected for study adjust the fluoride content of their water for dental health protection. A special fluoride study was made of these two and twelve other systems practicing fluoridation at the time of the study.

Four (4) counties were selected for study of small public water supplies located within them. Supplies of this type are excluded from Water Supply Program plan review and approval and their number and condition is largely unknown by the State program. Examples of this type supply are small trailer parks and subdivisions, campgrounds, recreation areas, and food service establishments. The four counties selected were Sarasota, Polk, Seminole, and Santa Rosa. These counties were selected to provide differing ground water geology, development patterns, geography, and local health department surveillance. Seventy-eight (78) small public systems were surveyed and sampled and it is estimated that 920,000 Florida residents and travelers may drink from these 78 supplies at some time during the course of one year.

FIGURE I

LOCATION OF WATER SYSTEMS STUDIED


SANTA ROSA
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▨ Small public water systems were evaluated in these counties

● Public water supplies evaluated

1. Belle Glade
2. Belleview
3. Camp-a-Wyle
4. Castle Villa
5. Cherry Lake
6. Edgewater
7. Everglades
8. Greater Pine Island (Matlacha)
9. Greenwood
10. High Point Mobile Home Park
11. Hollywood
12. Keaton Beach
13. Kendall Estates
14. Lake Adrian Trailer Park
15. Lakeport Water Authority
16. Lakeside Estates
17. Magnolia Springs Apartments
18. Miami
19. Oakland Park
20. Oldsmar
21. Quincy
22. Port St. Joe
23. Pensacola
24. St. Augustine
25. Sebring
26. Southgate
27. Spring Lake Manor
28. Tallahassee
29. Tampa
30. White Springs

PROGRAM EVALUATION

The basic water supply statutes, regulations, and program policies were reviewed. The Water Supply Program's activities, responsiveness to water supply problems, and staffing were also examined. Reported waterborne disease outbreaks were studied. Additionally, many waterworks personnel, municipal officials, health officials, and others were interviewed.

The Division's water supply chemistry laboratory was surveyed and evaluated, as was the Water Supply Program's chemical surveillance program. The Division's central bacteriological laboratory and surveillance activity in Jacksonville had been surveyed and evaluated by EPA personnel in 1972, and the results of that work have been used and supplemented in this evaluation.

EVALUATION CRITERIA

The effectiveness of the Florida Water Supply Program was gauged to a large degree on the bases of drinking water quality, adequacy and condition of water system facilities, and water supply surveillance.

WATER QUALITY

Bacteriological quality of public water systems was judged by comparing the bacteriological sampling record compiled during the 12-month period July 1972 to June 1973 against the Federal Drinking Water Standards. Any system failing to meet the bacteriological limits one or more of these months was considered to have failed the bacteriological standard. Bacteriological quality was judged "unknown" if the number of samples collected in one or more months was less than one-half the minimum number specified in the Drinking Water Standards and quality provisions were not otherwise violated. Since the Water Supply Program does not routinely sample all small public water systems, they were judged on the basis of a single bacteriological sample collected during the field visit and examined by a Florida Division of Health Laboratory. Any sample showing organisms of the coliform group in three or more of five 10 ml portions (MPN of 9.2 or greater) or having a membrane filter count exceeding 4 coliforms per 100 ml and/or having fecal coliform bacteria, was considered to have failed the bacteriological standard.

Chemical quality of public water supplies was judged on the basis of samples collected from the water system during the field inspection and on chemical analyses on file in State or water system offices. Radiological and pesticide samples were also collected from systems included in the interstate carrier water supply surveillance program. Chemical samples were analyzed by Environmental Protection Agency Laboratories. The concentration of each constituent reported was compared individually to the Federal Drinking Water Standards and determined as either meeting or failing the Standards.

FACILITIES

Public water supply source, treatment, operation and quality control were judged on the bases of the Manual for Evaluating Public Drinking Water Supplies and the Drinking Water Standards, employing the same interpretations as were used in the Tennessee, Kentucky, and Georgia Water Supply Program Evaluations.

Source

Quality of the source was judged where possible by chemical analyses, and also by past experience of the treatment plant operator. Quantity was judged by historical experience and current water demands. Source protection was judged by the type of source, potential and/or actual problems, and adequacy of monitoring conducted.

Treatment

Treatment was judged on the bases of the facilities and their operation (as observed on the day of the field visit), bacteriological records and chemical analyses. Adequacy of disinfection was judged by the presence of a detectable chlorine residual in all parts of the distribution system.

Distribution System

Finished water storage was judged adequate if elevated or non-pumped storage equaled or exceeded the system's average daily demand. Pumped storage was included only where on-site internal combustion or steam auxiliary powered pumping equipment was available. Raw water storage was also included if auxiliary power was available to provide treatment and pumping. Storage for "distribution only" systems included consideration of storage in the parent system. A distribution system pressure of at least 20 psi in all parts of the system was considered adequate for the purpose of this study. However, a minimum of 25 psi is considered desirable to insure optimum operation of all plumbing fixtures.

Quality Control

Water quality testing was judged by the bacteriological and chemical tests being performed by the water purveyor on finished water. Record keeping practices were judged by records maintained at the water treatment plant or water treatment plant operator's office and submitted monthly to the Bureau of Sanitary Engineering. The cross-connection control program was judged by the existence of an ordinance, program implementation, and progress toward eliminating hazards.

As shown in Tables III and IV, Appendix A, water system quality and surveillance, and system reliability were divided into categories for examination and rating. Each system was then assigned a "Reliability Rating" and a "Quality and Surveillance Rating", ranging from 0 to 10, which reflects the number and seriousness of deficiencies found. Zero deficiencies ("0" Rating) indicates least or little risk. A rating of 3 or higher was judged to indicate substantial departure from recommended practice, with attendant public health risk.

SURVEILLANCE

Water supply surveillance was judged on the bases of the Drinking Water Standards and the Manual for Evaluating Public Drinking Water Supplies. Bacteriological surveillance was considered satisfactory if the number of bacteriological samples examined per month from July 1972 through June 1973 met the minimum number specified by the Drinking Water Standards. Chemical surveillance was considered satisfactory if a finished water complete chemical analysis (as distinguished from normal in-plant operational checks) was performed by the State or an independent laboratory within the past three years. (The requirement that the analyses be complete was liberally interpreted. Credit was given for the routine analyses performed by the Division of Health laboratories, although few constituents of health significance were included.) Engineering surveillance was considered satisfactory if an inspection by Water Supply Program personnel had been made sometime during the 12 months preceding the survey. More frequent than annual inspections, however, are recommended for optimum surveillance.

OTHER CRITERIA

Chemical laboratory procedure was judged by *Standard Methods for the Examination of Water and Wastewater*.

FINDINGS ON FLORIDA WATER SUPPLIES

WATER QUALITY

The bacteriological quality of Florida water supplies is reflected by the following:

> Thirty-three (33) percent of the public water systems examined did not meet bacteriological standards one or more months of the 12 month evaluation period. These systems serve approximately 34,110 people. Insufficient data existed to adequately determine bacteriological quality of an additional 37 percent of the public water systems serving an additional 102,173 people.
>
> Three (3) percent of the 78 small public systems examined showed unsatisfactory bacteriological quality in the single sample collected and analyzed during this study. It is estimated that as many as 63,875 people (State residents and the traveling public) may be exposed to this water during one year's time.

Failure to meet bacteriological standards indicates a serious potential health hazard and calls for prompt corrective action. Additional details and supporting data may be found in Appendices A and B.

Chemical analyses of the water systems studied indicated that:

> All public water systems examined met the mandatory (health) chemical standards.

Twenty (20) percent of the public water systems examined failed to meet recommended (aesthetic) chemical standards. These six systems serve approximately 7,250 people.

Eight (8) small public systems in Polk County evidenced radiation levels for which the Standards prescribe more thorough investigation and evaluation.

Thirty-six (36) percent of the small public water supplies examined failed to meet one or more recommended chemical standards. As many as 236,000 people may be exposed to this water during one year's time.

The chemical standards are intended to assure that drinking water contain no impurity which would be hazardous to health or would cause offense to the sense of sight, taste or smell, or otherwise cause inconvenience. Good drinking water should have chemical characteristics better than the limiting values established by the standards. See Appendices A and B for additional details on chemical quality.

FACILITIES

Public Water Supplies

A sanitary survey of system facilities of the 30 public water supplies revealed that:

(Sources)

Ten (10) percent had inadequate source protection. Twenty (20) percent of the sources had unsatisfactory raw water quality.

Two (2) supplies were judged to have sources inadequate in quantity.

(Treatment)

Seventy (70) percent of the systems needed additional treatment facilities.

Thirty-seven (37) percent of the systems needed important changes in operation of present treatment facilities.

Thirty (30) percent of those systems which have equipment to chlorinate or which purchase and redistribute chlorinated water failed to maintain chlorine residual in all parts of the system.

(Distribution)

Forty-seven (47) percent of the systems had inadequate distribution storage.

All 30 systems reported adequate water pressures in the distribution system.

(Quality Control)

Fifty-three (53) percent of the systems were not maintaining and submitting adequate operational records and/or conducting adequate water quality testing.

Ninety-three (93) percent of the systems were found to have inadequate cross-connection control programs.

Only three of the public water supply systems were found to meet all system reliability criteria. The remaining 27 public water supplies were found to be deficient in one or more areas. Many systems had deficiencies in five or more. The average deficiency rating was 4.0, indicating a significant potential hazard to public health. See Appendix A for additional details concerning public water systems.

Small Public Water Supplies

Sanitary surveys of the 78 small public water supply facilities revealed that:

> Only 17 percent (13 systems) had automatic chlorination equipment.
>
> Ten (10) of the 13 systems which had chlorination equipment were found to have no chlorine residual at points of water use.
>
> Ninety-six (96) percent received an overall rating less than "satisfactory".

Small public water systems serve a large number of people in Florida and the deficiencies enumerated above indicate a serious potential public health hazard. See Appendix B for additional details concerning small public systems.

FLUORIDE PRACTICE

Sixteen (16) public water supplies in Florida adjust the fluoride content of their water for dental health benefits. These supplies serve fluoridated water to an estimated 1.5 million residents. Approximately 300,000 residents of 26 additional communities receive dental health benefits from natural fluorides. Therefore, about 28 percent of all those served by public water supplies in Florida receive fluoridated water.

The equipment, procedures, and quality control in the application of fluorides were examined at fourteen (14) fluoridated systems. (See Appendix C.) This study revealed that:

> All 14 fluoridated systems studied needed improvement in at least one aspect of their fluoridation program.
>
> Fifty-seven (57) percent of the systems were not fluoridating at the level recommended by the Florida Division of Health.
>
> Fluoride feeding equipment and facilities were judged satisfactory at all fourteen locations. However, feeding arrangements were judged unsatisfactory at five (36 percent) of the plants.

Fluoride chemical storage and disposal practices were judged satisfactory at all locations. However, seven (50 percent) did not have suitable safety equipment available.

Fifty-seven (57) percent of the operators were not able to analyze within ± 0.1 mg/l of the fluoride value determined by the Environmental Protection Agency fluoride laboratory.

All operators demonstrated adequate training in technology and control of fluoride application.

OPERATOR COMPETENCE

Evaluation of the operators and their qualifications for the 30 public water supplies studied indicated that:

Twenty-seven (27) percent of the water systems have operators who are not full-time employees or who also operate other scattered systems.

Thirty (30) percent of the systems had no operator certified by the State Division of Health.

Sixty-three (63) percent of the operators had received their waterworks training at State assisted short schools. Thirty-seven (37) percent of the operators had no formal waterworks training.

Seventy (70) percent of all systems studied failed to meet either or both of the bacteriological quality or bacteriological surveillance standards. Ninety-one (91) percent of the systems whose operators were not certified failed to meet these standards.

Eighty-four (84) percent of the systems studied had a Facilities Reliability Rating or a Quality and Surveillance Rating of 3 or greater, indicating significant departure from acceptable standards of public health protection.

The operation of small public water systems varies widely with type and size of the establishment served. Often the owner, manager, or person-in-charge also acts as water system operator. In some cases operation of the water facilities is delegated to maintenance personnel. Few, if any, of the small public water supply operators have received formal waterworks training.

SURVEILLANCE

Of the 30 public water supply systems studied:

Seventy (70) percent failed to meet bacteriological surveillance standards one or more months from July 1972 through June 1973.

Fifty-seven (57) percent had received a chemical evaluation during the past three years. However, the chemical analyses in most cases excluded many of the 26 constituents listed in the Drinking Water Standards.

Forty-seven (47) percent of the systems had not been inspected by a representative of the Florida Division of Health during the 12-month evaluation period.

Review of the 78 small public water systems indicated that:

Fifty-one (51) percent had not had a health agency visit in the previous two years. In most cases, a visit consisted of collecting a water sample and did not include a full inspection of facilities and operational practices.

Limited surveillance of small public systems was provided most often by county sanitarians who are not fully trained in maintenance and operation of water treatment facilities and who have many other duties unrelated to drinking water.

Generally, bacteriological and chemical surveillance was considered inadequate for systems serving the public.

THE FLORIDA WATER SUPPLY PROGRAM

AUTHORITY

Statute

The Florida Water Supply Program is administered under authority vested in the Division of Health. Section 381.261 of the Florida Statutes states "The division of health and its agents shall have general supervision and control over all systems of water supply... in the state insofar as adequacy, sanitary and physical conditions affect public health".

The Statute provides that "It shall be the duty of the division of health to...adopt, promulgate, repeal and amend rules and regulations consistent with law regulating...sanitary practices relating to drinking water made accessible to the public; [and to] watersheds used for public water supplies". (Section 381.031).

Control of water supply practice in the state is enforceable under provisions of either Chapter 381 or Chapter 386. The division is authorized to enforce its rules and regulations in Section 381.111, and to secure correction of menaces to public health under Section 381.291. Chapter 386 provides for the removal of any sanitary nuisance which may threaten or impair public health.

The Statute further specifies that any public or private institution or community must receive approval of the division of health before installing or altering a water supply system serving more than 25 inhabitants. In addition, the division may examine and certify all water treatment plant operators, with certification being mandatory after January 1, 1971.

Penalty for violation of a provision of Chapter 381 or an official Departmental Rule is as prescribed by law for a misdemeanor of the second degree, which is punishable not to exceed imprisonment for 60 days or fine of $500.

While the Statute does not specifically define a public water supply, The Division of Health is authorized to regulate "drinking water made available to the public". This wording has been interpreted to mean all supplies except those serving single family dwellings may be brought under regulation.

Regulations

The regulations for public water supplies currently in use by the Bureau of Sanitary Engineering are designated Chapter 10D-4, "Rules of the State of Florida Department of Health and Rehabilitative Services, Division of Health". These rules and regulations are supplemented by Chapter 10D-11, "Water Purification Treatment Plant Operators Certification".

Chapter 10D-4 principally includes definitions, philosophy of public health protection, drinking water standards, requirements for approval of new systems or system renovations, operation requirements, and requirements for permitting, location, construction and disinfection of public water supply wells.

Chapter 10D-11 principally includes definitions, statement of intent, and qualifications, examination and other requirements necessary for certification.

The definition of a "Public Water Supply System" provided in 10D-4.01 repeats that provided in the Statute: "A system serving more than 25 persons or otherwise making water available to public groupings or the public in general...". Requirements of the Rules are identical for all systems, except that bacteriological surveillance is dependent upon size of the system and plan review and approval is not required for systems serving less than 25 persons.

Policy

Design criteria, recommended operational guidance, surveillance procedures, and other required practices are examples of program policies which have been developed and used over the years but have not been included in the Rules of the Division of Health. Much of this guidance has been presented in memorandums issued by the Bureau of Sanitary Engineering. Other material has been retained within the Bureau for internal use only.

Official policy of the Division of Health must be issued by the Division Director. Thus the Bureau's memorandums and letters which establish standards or procedures of water supply practice are not official policy documents, and might better be termed "program guidance."

The Rules of the Division of Health, Chapter 10D-4, refers to a number of manuals and standard references which are recommended for guidance. References so mentioned are: Manual of Recommended Water Sanitation Practice (U.S. P.H.S.); Water Treatment Plant Design (ASCE); A Report of Committee of the Great Lakes - Upper Mississippi River Board of State Sanitary Engineers on Policies for the Review and Approval of Plans and Specifications for Public Water Supplies (New York State Department of Health); and Manual of Water Quality and Treatment (AWWA).

ENGINEERING ACTIVITIES

Program Goals and Priorities

Documents prepared by the Bureau of Sanitary Engineering indicate the following activities are, or should be, performed by the Water Supply Program:

1. Sanitary control of new construction or alterations to water supply systems:
    a. Review of engineering reports, plans, and specifications;
    b. Conferences and/or correspondence with owners and/or engineers regarding design;
    c. Final plan and specification approval by Bureau Director.

2. Sanitary supervision of plant and system operation:
    a. Bacteriological sampling program and review of bacteriological results with appropriate action if indicated;
    b. Field visits and investigations, with follow-up as circumstances require;
    c. Review of monthly operational reports submitted by the supplies, with appropriate action if indicated;
    d. Field inspection of new or modified treatment plants and assistance toward instituting good plant operation.

3. Public water supply wells:
    a. Review of application to construct water supply wells;
    b. Field investigation to determine suitability of site;
    c. Issue permit for drilling operations;

   d. Review well log and bacteriological, chemical, and physical laboratory analyses to determine treatment possibly needed;
   e. Approve use of water for public supply.

4. Interstate carrier water supply:
   a. Compilation of surveillance data on interstate carrier water supplies for annual and/or more frequent transmission to the Environmental Protection Agency.
   b. Annual field inspections of interstate carrier water supplies.

The activities set forth above have been established as program goals, with level of accomplishment principally dependent upon workload and available staff and resources. Because workload has generally exceeded the capability of program resources for accomplishment, activities have been assigned unofficial priorities to govern staff management. Emergency water supply problems with potential or actual public health consequences are given highest priority. Such situations may from time to time require significant staff time at the sacrifice of other more routine activities. Similarly, administrative duties and problems not rating as public health threats may also demand unscheduled staff time.

Among the regularly recurring activities, top priority is given to processing documents required by the Statute as a prerequisite to construction of new or expanded water system facilities. This includes review and approval of construction applications, plans and specifications for new water system construction or alterations or additions to existing systems, issuance of permits to drill water supply wells, and clearance of disinfected water supply facilities prior to initial use or restoration to use.

While the Water Supply Section in Jacksonville has maintained sanitary supervision of plant and system operation as a goal, the workload of new construction plan review and approval has forced virtual curtailment of surveillance activities. An exception to this is surveillance and supervision of the approximately 16 systems which adjust the fluoride content of their water for dental health protection. Jacksonville office staff make routine field inspections and review monthly laboratory reports on the fluoridation aspect of these supplies' operation.

Routine field surveillance has been predominently delegated to Regional and County Sanitary Engineers and to a lesser degree re-delegated to local health departments without sanitary engineers. Regional and County engineers also have responsibilities in connection with review and approval of new water supply system plans.

Plan Review and Approval

Chapter 10D-4 requires that written approval of the Division of Health shall be secured before any public water supply system is installed, extended, or altered.

This activity accounts for the major portion of staff time in the Water Supply Section. Over 2000 approvals have been issued annually in recent years, with the number continually growing. At least four professionals in the Water Supply Section essentially work full-time on plan review and approval. Authority to approve plans for distribution system extensions has been delegated to County Sanitary Engineers and to one Regional Engineer.

Review principally consists of comparing engineering design features of the plans and specification with Bureau guidelines and established principles of good engineering practice. Calculations and comments made in the review process are written on the plan sheets, which are permanently retained.

Monthly Operational Reports

Chapter 10D-4 requires that water plant records be furnished the Division of Health. Forms have been developed for this purpose, with requested information varying according to complexity of treatment used.

Review of monthly operational reports has been delegated to Regional and County Engineers. No attempt has been made to require small public water systems to submit monthly operational reports.

Field Surveillance

Program design would provide for sharing field surveillance of water system operations between the Water Supply Section in Jacksonville, the Regional Engineers, and the County Sanitary Engineers. In practice, however, Jacksonville personnel are occupied with other work, principally plan review and approval, such that little field surveillance can be provided.

The Water Supply Program has not promoted engineering inspections on a rigidly specified frequency, but annual inspections would be considered minimum. Several County Sanitary Engineers established monthly inspections as their goal, although none had been able to achieve this frequency.

Inspection frequency, comprehensiveness, and type of report made varied widely throughout the program. No standardization of practices or reporting has been provided by Bureau of Sanitary Engineering leadership. In the absence of a complete inventory of water supply systems in the State and standard reporting practices, the level of field surveillance presently provided program-wide cannot be documented.

Bacteriological Data Review

The bacteriological surveillance activity is the heart of public health protection in the Water Supply Program and is probably the most important routine program activity.

Bacteriological surveillance is required by Chapter 10D-4, which also specifies the minimum number of samples, quality standards, and establishes that samples shall be representative of the distribution system and collection location shall be established by the Division of Health. Laboratories submitting official sample results may be operated by the State Division of Health, County Health Departments, or the water utility.

Under current program procedures, review, interpretation, forwarding of results back to supplies, and record keeping of bacteriological sampling results has been delegated to County and Regional Engineers. Laboratories send sample results directly to the Regional and County Engineers, who interpret and record the data and forward these results together with appropriate instructions back to the supply.

Inventory

The Water Supply Program has maintained an inventory card file for a number of years. Technical data on each supply is recorded as well as ownership, address, population served, and similar information. Cards are updated from time to time by field personnel. However, there has been no concentrated effort in recent years to complete an updating of the entire file. Completeness and comparability of information is hindered by the fact that all field personnel do not share the same understanding of what size and type of supply should be included in this inventory.

Operator Training and Certification

Water treatment plant operator training and certification has been a joint effort of the Bureau of Sanitary Engineering and the Florida Water Treatment Plant Operators Association. Under authority of Chapter 381, the Division of Health is authorized to certify water purification plant operators who have provided appropriate evidence of meeting the required qualifications. Chapter 10D-11, which became effective November 17, 1970, makes certification mandatory after January 1, 1971.

The Water Supply Section prepares and grades the certification examinations. In addition, applications are reviewed by Bureau of Sanitary Engineering personnel for compliance with required equivalent experience and evidence of passing the University of Florida mathematics examination or an exemption examination. Certificates are issued by the Division of Health. Chapter 10D-11 provides for a Board of Review which acts only in an advisory capacity.

The Bureau of Sanitary Engineering indicates that 1722 certified operator certificates have been issued, with approximately 1400 having paid the annual fee in 1973.

Statewide operator training short schools are held annually at Gainsville and regional short schools are held at various locations throughout the State. This training is conducted by the Operators Association with participation in planning and instruction shared with Bureau of Sanitary Engineering personnel.

Of the 30 public water systems inspected as part of this evaluation, 30 percent did not have an operator certified by the Division of Health and 37 percent had not attended an Operators Association short school or any other formal waterworks training. Eighty-nine (89) percent of the systems whose operators were not certified had a Facilities Reliability Rating of 3 or greater and/or a Quality and Surveillance Rating of 3 or greater, indicating a significant breach in public health protection.

Cross-Connection Control

Chapter 381 of the Florida Statutes states it shall be the duty of the Division of Health to adopt and enforce regulations relating to sanitary practices in plumbing. Chapter 10D-4 expressly prohibits cross-connections, which are defined as "any physical connection or arrangement between two otherwise separate piping systems, one of which contains or is designed to contain potable and the other water or other fluid or material of unknown or questionable safety, whereby water or other fluid or material may flow from one system to the other, the direction of flow depending on the pressure or temperature differential between the two systems."

A state Plumbing Code has been adopted and is patterned after the Southern Building Code. All enforcement of the plumbing code is at the local level (city or county), as is licensing of plumbers.

Cross-connection control activity of the Water Supply Program consists of limited training and technical assistance. A Water Supply Section Sanitary Engineer acts as focal point for disseminating technical material on request and presenting talks at operator training schools.

Fluoridation Surveillance

Sixteen public water supply systems add fluoride chemicals to their water for dental health protection. (Only 14 were operating at the time of this study.) These systems serve approximately 1.5 million people.

The Water Supply Section, with analytic support from the Bureau of Laboratories, maintains surveillance over the fluoridation of these 16 supplies. Four to six samples are submitted monthly for analysis. An engineer from the Water Supply Section attempts to inspect each installation annually. A field study of fourteen of these systems revealed that nine had been visited in the previous 12 months.

Only 43 percent of the fourteen fluoridated systems rated evidenced a fluoride ion content in the distribution system within the limits recommended by the Division of Health.

Interstate Carrier Water Supply

The Interstate Carrier Water Supply Program in Florida is conducted jointly by the Florida Division of Health and the Region IV Office of the Environmental Protection Agency. The EPA is required by law to determine and certify the acceptability of water systems which provide drinking water to commercial passenger carriers operating in interstate commerce. Systems are classified APPROVED, PROVISIONALLY APPROVED (with the specific deficiency in parentheses), or USE PROHIBITED. The EPA and its predecessor agency has received valued assistance from State Water Supply Programs for many years.

The Florida Division of Health maintains surveillance over these supplies in similar fashion as over all public water supplies in the State. In addition, more frequent or complete sanitary surveys and chemical surveillance have at times been provided.

The EPA has requested that bacteriological surveillance data for all interstate carrier water supplies be assembled and analyzed monthly. Failures in bacteriological quality or surveillance should be reported by telephone immediately to the EPA, since the classification of the supply may be affected. In addition, annual summaries of bacteriological and other data are submitted for supplies which have not required more frequent submission of data.

As of April 1, 1974, there are 31 interstate carrier water supplies in Florida. Twenty-five (25) are classified APPROVED and 6 PROVISIONALLY APPROVED

LABORATORY SUPPORT

Bacteriological

The Rules establish standards for bacteriological quality of drinking water. A huge volume of laboratory work is necessary to determine compliance with these standards.

Bacteriological analyses are specified for all public water supplies with samples analyzed monthly to be representative of the entire distribution system. The number of samples analyzed is dependent upon population served, with the minimum number for any public supply being two per month. Recent Bureau of Sanitary Engineering documents, however, relax the bacteriological and chemical surveillance goals to a degree. Guidance now indicates that one bacteriological sample per month is sufficient for small public supplies serving fewer than 25 residents.

Under present program practice, few supplies in the State are maintaining bacteriological surveillance in complete compliance with the Rules. The findings of this study indicate that of the 30 systems investigated, only 10, or 33 percent, met the requirements of the Rules for bacteriological surveillance each month of the 12-month period July 1972 to June 1973.

Samples are most commonly collected by utility personnel and mailed or transported directly to a State, County, or water utility laboratory. In addition, many samples are collected by County Health Department personnel in lieu of utility staff.

Chemical

Chemical analyses shall be made as specified by the Division of Health. The Rules indicate that under normal circumstances, analyses may be made semi-annually. More frequent analyses are indicated if undesirable materials are known or suspected to be present. Where experience or other evidence indicates particular substances are consistently absent, the semi-annual analyses may be omitted.

Recent Bureau of Sanitary Engineering documents now suggest that chemical analyses be made annually for public supplies, with less frequent analyses for small public supplies.

The frequency and manner of sampling for physical substances shall also be determined by the Division. The Rules indicate that under normal circumstances, weekly analyses shall be made. These analyses are generally for operational control of treatment plants and are made in plant laboratories.

The findings of this study indicate that chemical surveillance goals are not presently being met. Only 37 percent of the 30 systems evaluated had received a chemical analysis during the year preceding the EPA inspection. It had been many years since the most recent analysis for several supplies, and no analyses could be located for five systems. Radiochemical analyses of drinking water have not been performed by the State in recent years.

Approximately 200-300 routine chemical analyses are performed annually in Division of Laboratories facilities in Jacksonville. Analysis is routinely made for twelve substances, only six of which are among the 26 substances included in the Federal Drinking Water Standards. Results are reported to the Water Supply Section, Bureau of Sanitary Engineering, where results are reviewed, filed, and forwarded to the supply. In addition to this, four to six fluoride samples from each of the 16 fluoridated supplies are analyzed monthly.

RESOURCES

Water Supply Program Organization

The Bureau of Sanitary Engineering is one of a large number of Bureaus reporting to the Director, Division of Health, Florida Department of Health and Rehabilitative Services. The Water Supply Program is administered within the Bureau of Sanitary Engineering. Programs administered by the Bureau in addition to the Water Supply Program include swimming pools and natural bathing areas, shellfish sanitation, and water system operator certification. See Figure II for an abbreviated Division of Health organization chart and an expanded representation of the Bureau of Sanitary Engineering.

Resources of the Water Supply Program consist of certain personnel of the Bureau of Sanitary Engineering in Jacksonville, Regional Engineers of the Bureau and their staffs located in several cities statewide, and County Health Department Sanitary Engineers and their engineering staffs located in nine of the States' more populous counties.

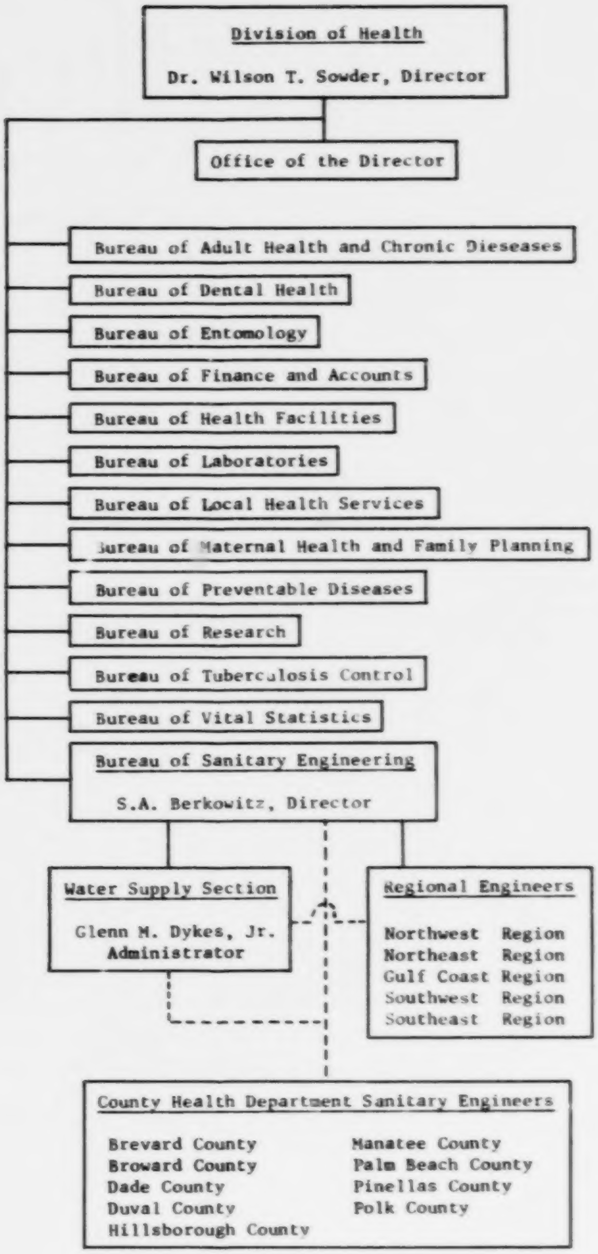
Jacksonville Office

Jacksonville Bureau of Sanitary Engineering staff considered a part of the Water Supply Program as of January 1974, is as follows:

Personnel	Position Classification
S. A. Berkowitz	Sanitary Engineer Director
N. Mastro	Asst. Sanitary Engineering Director
J. E. Santarone	Professional Engineer II
J. B. Aldendorf	Secretary III
V. R. Douglas	Secretary II
K. Fallon	Secretary I

FIGURE II

ORGANIZATION CHART


Division of Health
Dr. Wilson T. Sowder, Director
Office of the Director
Bureau of Adult Health and Chronic Dieseases
Bureau of Dental Health
Bureau of Entomology
Bureau of Finance and Accounts
Bureau of Health Facilities
Bureau of Laboratories
Bureau of Local Health Services
Bureau of Maternal Health and Family Planning
Bureau of Preventable Diseases
Bureau of Research
Bureau of Tuberculosis Control
Bureau of Vital Statistics
Bureau of Sanitary Engineering
S.A. Berkowitz, Director
Water Supply Section
Glenn M. Dykes, Jr.
Administrator
Regional Engineers
Northwest Region
Northeast Region
Gulf Coast Region
Southwest Region
Southeast Region
County Health Department Sanitary Engineers
Brevard County
Broward County
Dade County
Duval County
Hillsborough County
Manatee County
Palm Beach County
Pinellas County
Polk County

Water Supply Section personnel in Jacksonville report to the Director, Bureau of Sanitary Engineering. As of January 1974, the Water Supply Section consisted of the following:

Personnel	Position Classification
G. M. Dykes, Jr.	Professional Engineer III
S. N. Finney, Jr.	Professional Engineer II
L. P. Tuttle	Professional Engineer I
M. D. Webb	Professional Engineer I
W. H. Grisham	Professional Engineer I
E. D. Hayes	Sanitary Engineer III
Z. D. Harrison	Sanitary Engineer III
E. G. Brown	Sanitary Engineer II
M. A. Taylor	Secretary II
A. Richardson	Secretary II
K. L. Post	Secretary I
W. Morris	Secretary I

Regional Offices

Personnel under direct supervision of the Bureau of Sanitary Engineering are located in Regional Offices. The counties of the State whose health departments do not include sanitary engineering staff are divided into five regions, each served by a Regional Engineer. Regional offices and staff are as follows:

Office	Personnel	Position Classification
Pensacola	W. E. Tisdale	Professional Engineer II
	P. A. White	Secretary II
Jacksonville	J. M. Owen	Professional Engineer II
	L. H. Lewis	Secretary II
Winter Park	E. G. Snipes, Jr.	Professional Engineer II
	W. M. Bostwick, Jr.	Professional Engineer II
	R. Zadigan	Operator Instructor
	E. O. Daugherty	Engineering Technician III
	A. W. Gomis	Secretary II
	H. P. Howard	Secretary II
Sarasota	R. J. Hammerstrom	Professional Engineer II

Each Regional Engineer services approximately five to 20 counties.

County Health Departments

At the time of the evaluation, the staffs of nine County Health Departments included one or more Sanitary Engineers. In these counties, the Sanitary Engineer acts as the arm of the State Water Supply Program, with consultation and assistance provided directly from Jacksonville. Regional Engineers do not provide services to these nine counties. Based on information provided by the Bureau of Sanitary Engineering, County Sanitary Engineers and engineering staff which contribute to the Water Supply Program are listed as follows:

County	Chief	Total Engineering Staff
Brevard	J. D. Stevenson, Jr.	1
Broward	N. L. Tuckett	3
Dade	R. L. Quick	3
Duval	A. E. Bertram	1
Hillsborough	W. Cameron	1
Manatee	O. E. Randle, Jr.(Acting)	3
Palm Beach	F. J. Garjuilo (Acting)	2
Pinellas	H. Leadbetter	2
Polk	B. B. Cowden	3
	Total	19

From the above, 19 engineers are located in County Health Departments. It is estimated that, on the average, approximately 50 percent of county sanitary engineering staff time is devoted to Water Supply Program activities. Therefore, the equivalent of 10 engineers located in County Health Departments can be considered part of the Water Supply Program for this study.

Laboratories - Bacteriological

Bacteriological laboratory support for the Water Supply Program is provided by State Division of Health Laboratories, County Health Department Laboratories, and water utility laboratories.

Division of Health Laboratories

State Division of Health laboratories are located in seven cities throughout the State. These laboratories and the volume of drinking water bacteriological analyses performed in 1972 is listed as follows:

Laboratory Location	Number of Analyses
Jacksonville	18,475
Tampa	25,944
Miami	16,621
Pensacola	7,874
Tallahassee	7,714
Orlando	28,445 *
West Palm Beach	16,909

* Includes swimming pool samples.

County Health Department Laboratories

According to information provided by the Bureau of Laboratories, fifteen county health departments operate laboratories authorized to perform routine drinking water bacteriological analyses. These laboratories and the volume of drinking water bacteriological analyses performed in 1972 are listed below. The totals include an unknown number of samples from private individual water systems.

County	Number of Analyses
Alachua	1,505
Duval	7,572
St. Johns	878
St. Lucie	830
Sarasota	11,128
Polk	2,724
Pinellas	17,278
Manatee	2,470
Marion	2,763
Lee	3,844
Indian River	713
Hernando	426
Citrus	479
Charlotte	2,057
Brevard	4,052

Water Treatment Plant Laboratories

Approximately 51 drinking water bacteriology laboratories are maintained by public and private water supplies. These laboratories perform an unknown but large number of bacteriological analyses each year.

Laboratories - Chemical

The Division of Health Bureau of Laboratories maintains a drinking water chemistry laboratory in Jacksonville. Limited chemistry capability is also available at the State Branch Laboratory in Miami. According to laboratory records, 260 samples were analyzed for a limited number of constituents during 1972. These routine analyses consisted of 12 substances, only six of which are included in the Federal Drinking Water Standards. At the present time, no capability is present for pesticides, heavy metals, or radiochemical analyses at the Jacksonville lab. Radiochemical capability is available at the Division's Bureau of Preventable Diseases, Radiological and Occupational Health Section facility in Orlando, although no appreciable number of drinking water samples have been run in recent years.

Many independent commercial laboratories operate in Florida and neighboring states. Many water systems obtain routine chemical analyses from these private laboratories.

BUDGET

The Bureau of Sanitary Engineering's budget for fiscal year 1974 was $603,356. Included in this amount are funds to support the Sea Resources Section as well as the Water Supply Section and the Regional Engineers. Based on positions assigned each activity, it is estimated that about 61 percent of this amount, or about $369,200 is used to support the engineering activities of the Water Supply Program.

Perhaps more significant than budget figures in dollars are program staff in positions. Data provided by the Bureau of Sanitary Engineering indicate the Water Supply Program staff over the preceding years as follows:

Year	Water Supply Section Staff		Field Staff	
1960	7 Professionals	3 Clerical	5 Engineers	3 Clerical
1965	9 Professionals	4 Clerical	5 Engineers	3 Clerical
1973	8 Professionals	4 Clerical	5 Engineers	4 Clerical

From the above, it is apparent that no appreciable increase in personnel resources were added to the Water Supply Program during recent years. Increases in budget during this period generally reflect rising salaries, travel expenses, and operating costs without providing resources for needed additional services.

No attempt has been made to define an "equivalent budget" for sanitary engineering services provided by nine County Health Departments, or to place a value on laboratory services received.

WATER SUPPLY PROGRAM NEEDS

AUTHORITY

Statute

Two legal methods are available to the program for enforcement. One involves the Division's legal staff applying to an appropriate circuit court for an injunction restraining a person from violating the Division's Rules or the Statute. The second method involves obtaining assistance of the State Attorney to enforce Rules through prosecution of an offender in criminal courts (in which case, the offense is a misdemeanor of the second degree, punishable as indicated previously.) Other legal methods probably exist, but as the Chief Council for the Division said, "No time is available for legal innovation or creativity".

Statutory enforcement authority lacks two essential ingredients for an effective regulatory program. The first is authority to quickly initiate legal enforcement procedures against a violator. Present statutory authority provides for quick action in "emergencies", but such powers are seldom, if ever, used. The second feature needed is access to civil courts with penalties commensurate with the seriousness of violations of public health rules and comparable to penalties available to other Florida environmental programs.

All authority for the Division is based upon protection of public health, whereas in fact many Division of Health activities, including those of the Bureau of Sanitary Engineering, relate more to promotion of public welfare. It would be helpful if new language added to the Statute were to include promotion of public welfare as a legitimate purpose.

The Statute does not authorize or direct the Division to pursue programs to assure comprehensive, orderly development and expansion of public water supplies, nor does it recognize or make reference to other State agencies which may be attempting such regulation and control. Planning for best use of water and land resources is needed and Statutory authorization should be provided to support Bureau of Sanitary Engineering efforts to this end.

Regulations

The applicable regulations, Chapter 10D-4 and Chapter 10D-11, provide the general basis for operation of an effective water supply program. Certain key definitions are included, and the principle is established that the Division of Health has ultimate control of the water supply industry insofar as the public health protection of drinking water is concerned.

Technical detail and quantitative design requirements are generally excluded from the Rules. While a complete "cookbook" of treatment plant design and operational control equipment and procedures may not be desirable, certain standard procedures and performance requirements may be usefully established for the guidance of Consulting and Municipal Engineers and Program field staff.

Submission of plans and specifications for any new system or renovation of an existing system must be prepared by an engineer registered to practice in Florida. A certificate that the project has been approved by the appropriate local governing body also is required. Language is not included, however, which makes reference to coordination with agencies conducting comprehensive county or regional water system planning. Such coordination is needed to curtail proliferation of small systems which have often been found to fail minimum standards for health and safety and which present a burden to regulatory agencies.

Requirement is not included in the Rules that the registered engineer who prepared the plans and specifications certify that construction was in conformance with the approved plans and specifications. Such certification is needed.

The Rules do not include standards for raw water suitable for treatment and use for potable purposes. It is recommended that future revisions of the Rules include standards and guidance regarding quantity, quality, and protection of source as well as data which must accompany plans, specifications and related documents submitted for approval. It may also be appropriate to reference applicable surface water quality criteria of the Florida Department of Pollution Control. Requirements for collection and submission of raw water surveillance data are also recommended.

Requirements for finished water bacteriological surveillance are adequately specified. The Rules also specify that laboratories performing bacteriological analyses shall be subject to inspection by the Division. It is recommended that this provision be strengthened by requiring all bacteriological laboratories to be certified by the Division.

Laboratory equipment and nature and frequency of tests a water treatment plant should perform for operational control are not specified in the Rules. It is recommended that minimum equipment and tests for operational control for various types of treatment be specified.

It would appear that present wording of the Rules includes bottled water under the regulation of the Division of Health. Consideration should be given to adding surveillance and quality standards to the Rules. If it is preferred that another State agency have jurisdiction, language should be added to the Rules excluding bottled water.

Policy

Program guidance provided by the Bureau of Sanitary Engineering serves to interpret and supplement the Rules. Such guidance may be formally distributed as memorandums or simply be a prevailing understanding among Water Supply Program staff.

Several guidance memorandums issued in 1973 have made, and will continue to make, considerable impact on the water supply industry in Florida. These include quantifying the requirement of the Rules for level of chlorine residual to be present in all parts of the system at at least 0.2 parts per million. This has prompted significant increases in chlorine application rates throughout the State. Another major issuance from the Bureau Director requires complete treatment of all new and existing water systems in the three heavily populated south Florida counties by 1975. It is unfortunate, however, that these directives have not been fully "sold" to all professionals on the Water Supply Program team. There is significant disagreement with both the chlorine residual and complete treatment directives, and compliance is therefore not universally promoted or considered desirable by field personnel of the program.

Operating guidance and procedures for bacteriological surveillance were assembled in 1962 into a small document entitled "Manual of Practice on Sampling, Reports and Procedures for Bacteriological Examination of Water". No other such compilation has been prepared, however. It is recommended that the Bureau's requirements, guidelines and procedures relating to other aspects of the program be assembled and made available for distribution to water supply operators, managers, local health departments, and consulting engineers.

The list of standard references and manuals provided in Chapter 10D-4 includes at least one which has been superceded by a later publication. It is recommended that the list of references be revised and updated.

ENGINEERING ACTIVITIES

Program Goals and Priorities

The engineering activities of the Water Supply Program and the priorities attached to them are outlined in preceding sections. The findings of this evaluation generally substantiate the position repeatedly taken by the Water Supply Program that responsibilities were not being fulfilled in the protection of public health.

Annual Reports of the Division of Health have intermittently reported that field surveillance of water systems has been inadequate for the past 20 years. In each of the Annual Reports for the past five years, the narrative sections report this deficiency. Excerpts of this language follow: "...there was not an adequate program for surveillance of public water supplies." (1968); "The total environmental protection effort required more than was made available." (1969); "Only limited waterworks operation surveillance activity was carried out because of press of other work." (1970); "Again, the press of other work in the program resulted in virtual setting aside of water works operation surveillance, only limited features being carried out." (1971); "The major difficulty continues to be a sufficient staff to meet assigned responsibilities effectively and constructively." (1972).

Shortage of staff and resources has prompted the Water Supply Program to partially abandon hopes for a fully adequate surveillance and regulation program. In addition, the performance of some engineering activities is so hurried as to be ineffective. A water supply program carried out in a random or incomplete manner promotes a false sense of security regarding the reliability of water systems in the State. While the EPA recognizes the necessity for establishment of priorities under existing circumstances, a fully satisfactory water supply program will require vigorous attention to all aspects of the program.

Plan Review and Approval

Plan review and approval activity has consistently received a major share of Water Supply Program staff time. Nevertheless, late in 1972 an approximate 100-day backlog existed. Concerted staff effort was able to reduce this backlog, but processing time for plans at times still exceeds 30 days. Sufficient resources are needed to prevent a backlog from developing or from work to be hurried and perhaps superficial from deadline pressures.

Substantial benefit has accrued from the plan review and approval activity over the years. Many supplies have been required to treat their water to meet esthetic parameters of the Drinking Water Standards and in some cases extension of the larger public supplies has been required rather than development of many smaller systems. These policies have resulted in better drinking water service for thousands of Floridians. Nevertheless, much remains to be done. This is particularly true in the consolidation of smaller supplies.

The plan review activity should lead a program-wide thrust to bring about an end to unplanned proliferation of small systems and the consolidation of existing systems.

No changes are recommended in present policy delegating review and approval of distribution system extensions to County Sanitary Engineers and Regional Engineers. Review and approval of treatment plants should continue to be done by the Jacksonville Water Supply Program staff in order to better control compliance with Bureau requirements.

Monthly Operational Reports

The findings of the field inspection phase of this study indicated that at least 23 percent of the public supplies examined did not regularly submit monthly reports. More careful attention is needed in the review and recording of monthly reports. A recording system should be devised for statewide use which would allow a reviewing engineer to determine in a moment if monthly reports had been received for all recent months. The success of such a system hinges on assembling a complete inventory of public water supplies. Such an inventory is not presently available.

Field Surveillance

It has been stated in earlier sections of this report and documented over the years in the Division of Health Annual Reports that field surveillance of water system operation has consistently been at unsatisfactorily low levels. The findings of the field inspection phase of this study confirmed this assertion, with 47 percent of the 30 supplies examined not being inspected by the Water Supply Program during the 12-month period July 1972 through June 1973. Of these 30, available records indicated that 8 supplies had never been inspected.

The demands of work related to review and approval of new or modified water systems has prevented the Water Supply Section (Jacksonville) personnel from contributing significantly to field surveillance. This work has been essentially done by Regional and County Engineers, under supervision of the Bureau of Sanitary Engineering. In general, the frequency of field inspection is much more adequate in Counties staffed with a County Engineer than in Counties served by Regional Engineers. Several County Engineers stated their goal for inspection frequency was once per month, and while this was not attained, several inspections could often be demonstrated during a years' time.

Procedures for scheduling, reporting, or record-keeping of field surveillance activities were instituted by the individual Regional or County Engineer. No statewide direction has been forthcoming from the Bureau of Sanitary Engineering concerning establishing a complete inventory of public and small public supplies, standardizing procedures, record-keeping practices, or field survey report format. The number of water supplies requiring inspection is not known and neither is there a summary of statewide Water Supply Program activity. Therefore, it is not possible to document either the present level of activity or the short-fall from that which is needed.

While it is not desirable to so encumber field staff with record-keeping and reporting duties that productive work is limited, more structuring of Water Supply Program field staff activity is needed.

It is recommended that a complete inventory be undertaken of all water systems in the State which are covered by the Statute. If different levels of surveillance for different types of supplies is to be program policy, then a classification system should be defined and incorporated into the inventory. It is also recommended that routine field inspection forms be devised and provided for use of all field personnel of the Water Supply Program. Such forms should not be burdensome to complete for the inspecting engineer, but would provide a record for both the engineer and the supply of what facilities were viewed, who was contacted, and what instructions were given. Record-keeping procedures should be devised for each County or Regional Engineering office which would provide easy determination of the interval since last inspection.

Bacteriological Data Review

The bacteriological surveillance activity is the heart of public health protection and is probably the most important of Water Supply Program routine duties. Review, interpretation, notification of supplies, and record-keeping of bacteriological sampling results has been delegated to Regional and County Engineers, who receive results directly from the laboratories.

While precision and accuracy of laboratory work is not questioned, the collection of samples and review, interpretation and follow-up of bacteriological results was generally found to be the weakest aspect of the Florida Water Supply Program. Of the 30 public systems inspected as part of this evaluation, only 10 met the requirements of Chapter 10D-4 for number of samples collected for the entire 12-month rating period. Only nine met the quality requirements for all 12 months.

The problems with bacteriological surveillance begin with the philosophy espoused by program leadership and are compounded by severe personnel shortages. Bacteriological surveillance has been subordinated in importance to the engineering aspects of water system facilities. It is recommended that bacteriological surveillance be reaffirmed as the most crucial activity in public health protection.

Adequate regulatory authority is available since bacteriological standards are included in Chapter 10D-4. These bacteriological standards are identical to the current Federal Drinking Water Standards and are considered fully satisfactory until such time as revised Federal standards are published. The current Florida

Water Supply Program, however, does not routinely determine if supplies in the State are meeting these standards. Water Supply Program professional staff at all levels have demonstrated their belief that failure to meet official State standards does not necessarily indicate a problem or signal a potential public health threat. The program has demonstrated willingness to declare that unsatisfactory bacteriological quality, when frequent and severe enough, does signal a potential health problem. The point at which this determination is reached, however, is an indefinable matter of judgement, and has been shown not to coincide with the official standards of the Division of Health.

Forms provided to the Regional Engineers for recording bacteriological data do not easily yield information needed to determine compliance with the Standards. Neither do the present forms bring to attention supplies which have failed to submit sufficient samples. It is recommended that new procedures and forms be developed which provide for monthly bacteriological summaries of all systems under surveillance.

Systems failing either quality or surveillance provisions of the Standards should be noted for appropriate follow-up action. The present practice of an immediate engineering review of all unsatisfactory sample results should be maintained and improved so that time lag between sample collection and response to acute bacterial contamination is minimized.

Crucial to health protection is immediate and decisive response when routine monitoring shows bacteriological quality problems. Responsibility for this response rests with the Water Supply Program in instances where State or County laboratories perform the analyses. When the utility collects and analyzes the samples, they must be instructed in the requirements for interpretation, re-sampling, and other appropriate responses. In any case, it is recommended that 5 to 10 percent of the required monthly samples be collected by County Health Departments or other personnel independent of the utility to be analyzed in a certified laboratory other than the utility laboratory.

The Federal Drinking Water Standards and Chapter 10D-4 define an unsatisfactory sample for both the multiple fermentation tube and the membrane filter methods of analysis in identical terms. Water Supply Program policy documents and observed program practice employ different definitions of unsatisfactory quality in a single sample. Drinking Water Standards call for immediate collection of daily check samples from the same sampling point in response to unsatisfactory quality in a routine sample. Sampling should be continued until two consecutive negative samples are obtained. With few exceptions, bacteriological records examined showed only a single check sample was submitted. In addition, 6 or 7 days was observed to be the usual interval between collection of a routine sample of unsatisfactory quality and collection of the first (and usually only) check sample. This interval is considered too long for a fully satisfactory response to a potential public health problem. In order to provide a more rapid response, the following should be implemented:

1. Provide for consistent telephone notification of unsatisfactory quality;
2. Revise laboratory schedules such that samples may be accepted and processed over weekends and holidays;
3. Establish a pending file or otherwise provide for positive control to assure that check samples are submitted;
4. Proceed with plans to institute automatic data processing techniques for storage, analysis, and retrieval of data.

Inventory

Previous sections of this report have pointed out that without a complete inventory of all public and small public water supplies in the State, it cannot be assured that surveillance activities are reaching most or all supplies making water available to the public. Only basic information would be initially needed, such as name, address, contact point for person in charge, type of source, type of treatment, and approximate number of persons served.

Effective use of automatic data processing for handling bacteriological data would hinge on first assembling a complete inventory The assistance of county health departments in locating marginal supplies should be arranged.

Operation Training and Certification

The operator training and certification program appears to have impacted a large number of operators across the State. Much remains to be done, however, as evidenced by the large number of systems included in this evaluation which had facilities, operation, and/or surveillance deficiencies. In addition, many supplies have not yet participated in the program.

It is recommended that operator certification be more aggressively promoted at all program levels, particularly by field staff. Further, it is recommended that future revisions to Chapter 10D-11 add certain self-policing activities to the responsibilities of the Board of Review. The present Regulation does not provide for a hearing before the Board for cause other than drunkenness, fraud, or felony. Provision should be made for a hearing in the event of gross negligence in water system operation or failure to follow a directive of the Bureau of Sanitary Engineering.

Cross-Connection Control

Plumbing and cross-connection control is not accorded high priority in the allocation of budget and staff resources by the Bureau of Sanitary Engineering. Although a State Plumbing Code has been adopted, no program exists to assure that local governments are enforcing the State code or a more stringent local code.

Cross-connection control activities are generally differentiated somewhat from plumbing programs, which impact new construction or alterations but do not seek out existing hazardous installations. The American Water Works Association has endorsed the principle that the water purveyor has the responsibility to assure its customers safe water under all foreseeable circumstances. The Association further asserts that the purveyor must take responsibility to reasonably protect the entire community distribution system from hazards which may originate on the premises of customers. The Environmental Protection Agency supports the AWWA position and recommends that state agencies regulating the water supply industry assume a major leadership role in promoting and implementing vigorous cross-connection control programs in local utility organizations.

Field investigations conducted as part of this study showed that only two of the 90 supplies inspected had a minimum program for routine inspections and control of potential hazards on customers' premises.

It is recommended that with increased resources recommended in this report, the Water Supply Program re-evaluate its level of concern for cross-connection hazards. Guidelines for operation of local programs should be developed, distributed and vigorously promoted and supported.

Fluoridation Surveillance

Based on the findings of the field visits to fourteen fluoridated supplies, certain improvements are needed in the surveillance of fluoridation operations. Complete recommendations for program improvements are detailed in Appendix C.

Among the more important recommendations for program improvement are:

a. Operators of water systems which fluoridate should be required to conduct fluoride analyses according to Standard Methods to within ± 0.1 mg/l of the value reported on the State check sample.

b. More rigorous operation review and assistance is needed to prevent interruptions in fluoride feed, improper operation of equipment, and unsafe procedures.

c. At least annual inspections by a Bureau of Sanitary Engineering Engineer should be made.

d. Better distribution of check samples through the month is needed, along with more rapid return of laboratory results to the operators.

Interstate Carrier Water Supply

Water Supply Program participation in the interstate carrier water supply certification program has been subject to the same staff limitation constraints as other program activities. The recommended annual sanitary survey has not consistently been conducted in recent years. Although complete chemical analyses have not been performed annually, chemical surveillance for interstate carrier supplies has been more extensive than for most other supplies in the State.

The Rules of the Florida Division of Health specify identical standards for bacteriological quality as do the Federal Drinking Water Standards upon which the interstate carrier water supply certification program is based. Nevertheless, as described previously, strict compliance with the State standards is not systematically determined by the Water Supply Program. In addition, at times the administrative mechanisms of the Water Supply Program have failed to determine compliance of interstate carrier water supplies with the Federal Drinking Water Standards, resulting in late notification to EPA of failures to meet standards. These delays have resulted in necessary classification changes being delayed and therefore not fully responsive to the public health protection function which the program should serve.

More careful staff attention and more consistent communications between various Water Supply Program personnel are needed for the interstate carrier water supply certification program to be effectively administered in Florida.

LABORATORY SUPPORT

Bacteriological

Bacteriological laboratories provide the data from which acceptability of drinking water supplies is determined. Under the operative policies in Florida, the laboratories do not provide interpretation of results, do not compile quality records for a water supply, and do not directly notify the sampler of results.

Most of the program needs indicated above for bacteriological surveillance must be addressed by the engineering activity. Nevertheless, movement toward a fully satisfactory surveillance program will require increased services and changes by the bacteriology laboratories. These [illegible] as surveillance is extended to more supplies, particularly the small public supplies not presently under monthly sampling programs. Revised laboratory schedules will also be needed such that check samples and special samples can be accepted over weekends and holidays, if necessary. In addition, incorporation of automatic data processing techniques will necessitate procedural changes in reporting of results.

Chemical

Chemical surveillance of drinking water will assume greater importance as natural waters become subject to increasing industrial and agricultural waste discharges. This study documented that present chemical surveillance is not reaching all systems and [illegible] constituents of health concern are seldom performed.

The principle needs of the drinking water chemistry laboratory are:

a. Expansion of capability such that analyses for all constituents of the Drinking Water Standards can be performed on a volume basis.

b. Additional equipment and expertise to perform special analyses in the event of an accidental chemical spill or other unusual problem.

c. Through coordination with the Division of Sanitary Engineering, establishment of a record-keeping system to allow easy storage and recovery of data and designed to bring to attention supplies whose analysis is not current.

RESOURCES

Water Supply Program Organization

The Water Supply Program is the predominant program of the Bureau of Sanitary Engineering. The Water Supply Program Regional Engineers report directly to the Bureau Director, and the County Health Department Sanitary Engineers receive guidance from the Bureau Director. The Bureau's Water Supply Section is located in Jacksonville and is headed by an Administrator, who does not have direct supervisory authority over Regional and County Engineers. However, appropriate working relationships are maintained.

Water Supply Section activity relates predominantly to processing documents and conducting liaison with municipalities and consulting engineers regarding new or modified water system facilities. The necessity for this activity under the Statute and the Rules has been discussed earlier. Heavy workloads necessitated by Florida's rapid growth have precluded emphasis on operational and maintenance surveillance by the Water Supply Section. To a lesser extent, this has also been true of the Regional and County Engineers time.

Jacksonville Office

It is recommended that two Sections be created in the Bureau of Sanitary Engineering with equal status in the Water Supply Program.

One Section should assume many of the responsibilities now discharged by the Water Supply Section. This section would principally be concerned with developing treatment plant design standards, specifying levels of treatment, providing notice to communities of the necessity for additional capacity or treatment processes, and conducting review and issuing approvals of plans and specifications for construction of new or modified water system facilities.

The second Section would be the focal point for engineering surveillance and monitoring activities. This Section would be responsible for developing policies, procedures and schedules, coordinating field surveillance of water systems, conducting review of monthly operating reports, bacteriological and chemical surveillance data, with coordination of necessary follow-up activities, directing technical and emergency assistance to water supply systems, and coordinating the Bureau's activities in water treatment plant operator training and certification.

Regional Offices

Strengthening of Regional Offices will impact most directly on the critical need for increased field surveillance of water system operation throughout the State.

It is recommended that ultimate development of the regional office system include plans to implement the following:

a. Expansion of the number of regions. Tallahassee and Fort Pierce are suggested as potential locations for new Regional Offices. Re-alignment of counties comprising each region would also be needed; and

b. Expansion of professional staff at each Regional Office to at least two. The intent of this is to make possible reasonably constant office coverage such that response to emergencies and essential public health surveillance is not delayed.

County Health Department Sanitary Engineers

While the County Sanitary Engineers act for the State Water Supply Program, enforce the State Rules, and receive guidance from the State Program, the association is loosely drawn. It is not within the authority of the State Program to direct changes or expansion of County Health Department engineering staffs. For this reason, detailed recommendations regarding staffing and operation of County Health Departments were not considered appropriate to this report.

It is the general observation of this study that while County Health Departments were usually able to provide more intensive public health surveillance than Regional Engineers were able to provide, improvements in level of services, as well as quality of services, are needed.

Frequency of engineering inspections may, in many instances, exceed the minimum levels recommended in this report. Monthly inspections were stated as the goal in several counties. It is suggested that staff time may be better spent in more careful review of operational reports and bacterial surveillance data, with routine field inspections made quarterly. Supplies with known or potential problems may require more frequent surveillance.

Water Supply Program Staffing

Estimation of staff for an adequate Water Supply Program is dependent upon an accurate inventory of all water systems for which the program has responsibility under the Statute. Such an inventory is not presently available. The estimated 1800 public water supply systems used throughout this report will be employed to project staff needs.

It is further apparent that rapid population growth in Florida necessitates inclusion of growth factors into any long-term workload estimation. Official projections by the University of Florida anticipate a state-wide annual growth rate of about three percent per year. A higher growth rate may be more realistic for the water supply industry, however.

The EPA has estimated that, on the average, 4 man-days of engineering staff time are needed each year per public supply for surveillance activities, which include:

- Sanitary surveys with informal operator training
- Plan review for system expansion and related consultation and correspondence
- General technical assistance
- Special investigations
- Review and processing of bacteriological, chemical, and operational data.

Engineering surveillance of small public supplies (such as restaurants, motels, campgrounds, etc.) is estimated to require one man-day per supply per year.

Additional Water Supply Program staff is needed for promoting and conducting operator training and certification activities.

Management and supervision of the engineering staff becomes increasingly significant as an organization's size and complexity increases. It is recommended that total professional staff requirements be increased by approximately 15 percent for management and supervisory personnel.

Assuming 220 man-days equals one man-year, professional staff requirements for an adequate program for health and engineering surveillance of public water systems in Florida can be estimated as follows:

Engineering surveillance

$$1800 \text{ supplies} \times \frac{4 \text{ man-days}}{\text{supply}} \times \frac{1 \text{ man-year}}{220 \text{ man-days}} = 33 \text{ people}$$

Management and Supervision

33 people x 15 percent = 5 people

Training and certification

2 people

Full engineering surveillance of small public water supplies will require additional personnel as estimated below:

Engineering Surveillance

$$5000 \text{ supplies} \times \frac{1 \text{ man-day}}{\text{supply}} \times \frac{1 \text{ man-year}}{220 \text{ man-days}} = 23 \text{ people}$$

Management and Supervision

23 positions x 15 percent = 3 people

From the foregoing, it is seen that an engineering staff of at least 40 professionals is needed for adequate administration of a surveillance program for supplies serving 25 or more residents. Up to 26 additional professionals are needed for full surveillance of all public water systems for which the State program has responsibility under the Statute.

Adequate clerical support is also essential to a satisfactory program. One secretary for each three professionals is offered as a guideline.

Considering existing staff of the Water Supply Program, the immediate staff increases recommended above for surveillance of public supplies would result in expansion from 25 professionals (10 in Jacksonville office, 5 in Regional offices, and 10 estimated equivalent positions in County Health Departments) to at least 40 professionals. This will require the addition of 15 professional positions. The major part of this increase should be assigned to existing Regional Offices such that each region has at least two professionals. Consideration should also be given to locating and staffing the additional Regional Offices recommended above to reduce travel distances and better distribute responsibility. In addition to the 15 professionals, at least five secretaries are also needed for increased clerical work.

Subsequent phased additions of up to 26 professional positions are needed for the Water Supply Program to implement a state-wide program for surveillance of small public water systems. These positions should be assigned primarily to Regional Offices and perhaps to County Health Departments.

Records maintained by the Water Supply Program indicate workload increases may be expected at about five percent per year resulting from population increase. Since growth is expected to continue in the future, in order to maintain satisfactory levels of service, at least two additional professionals must be added each year.

Federal drinking water legislation is currently pending in Congress. In the event such legislation becomes law, the manpower needs outlined above may need revision upward.

Laboratories - Bacteriological

Based on data presented earlier regarding bacteriology laboratories and reported drinking water sample workload in Florida, approximately 180,000 samples were analyzed in State and County Health Department laboratories in 1972. This number, however, includes some samples from private, single-family systems. The number analyzed from public supplies would be somewhat less. An unknown but presumably large number of samples were also analyzed at the approximately 51 water utility laboratories.

In spite of the many analyses documented above, the findings of this study indicate that 63 percent of the public water systems and essentially all of the small public water systems are not submitting the number of bacteriological samples required by the Florida Rules and the Federal Drinking Water Standards. In order to bring all supplies into compliance, a large overall increase in the number of samples analyzed will be needed.

Based on the data above and the field evaluation findings of this study, an estimation of the additional drinking water bacteriological laboratory support needed for complete surveillance can be made. The largest increment of additional samples would come from the estimated 5,000 small public supplies which presently receive little bacteriological surveillance. Two samples per month from each of these supplies plus a lesser number of raw water samples, special samples and check samples would add approximately 125,000 samples per year to the overall total.

The detailed bacteriological record for the 30 public supplies was examined. Although 63 percent failed to meet minimum standards, the number of additional samples needed to bring the surveillance up to standards was not necessarily large. It was found that on the average, 22 additional samples per supply per year would, if collected at appropriate times, bring each system up to minimum standards. Extrapolating this average number for the estimated 1,800 systems statewide, it is seen that approximately 40,000 additional analyses will be needed per year.

From the above, it is seen that laboratory capability to analyze at least an additional 165,000 samples per year will be needed for minimum satisfactory bacteriological surveillance.

Laboratories - Chemical

The Florida Division of Health Rules recommends chemical analyses twice annually for all systems. In practice, however, annual analyses are suggested.

The Environmental Protection Agency has recommended that routine analyses be performed at least as often as indicated below. More frequent analyses may be appropriate initially in order to define problem areas and establish a data baseline for later comparison.

	Frequency		
Analysis	Surface Source	Ground Source	Small Public
Wet Chemistry	1 year	3 year	5 year
Trace Metals	1 year	3 year	5 year
Pesticides	1 year	*	*
Organics-Carbon Absorbable	1 year	*	*
Radiochemical	3 year	*	*

* No routine schedule recommended. Occasional sampling as part of special studies should be expected.

Based on the knowledge that only about 20 supplies Statewide use surface sources, the following annual chemical surveillance needs for larger public systems can be projected:

Analysis	Surface Source	Ground Source	Special** Study	Annual Total
Wet Chemistry	20 x 1 = 20	1780/3 = 593	25	638
Trace Metals	20 x 1 = 20	1780/3 = 593	25	638
Pesticides	20 x 1 = 20	-	25	45
Organics - CA	20 x 1 = 20	-	25	45
Radiochemical	20/3 = 7	-	100	107

** Estimated numbers.

The annual totals indicated above may need to be revised upwards since many systems have multiple sources and multiple plants. In addition, in many instances both raw and treated water analyses will be desirable. Further increases of up to 1000 analyses per year may be necessary as small public water systems are brought under surveillance.

Budget

Engineering

The FY 74 budget for the Water Supply Program was $369,200. This does not include County Health Department engineering staffs or drinking water laboratory activities.

The dollar cost of staff increases recommended for a fully satisfactory Water Supply Program is estimated below. Assumptions employed are as follows:

a. Average cost per professional employee per year:

Salary:	$15,000
Fringe Benefits:	2,500
Travel:	2,000
Miscellaneous:	1,500
Total	$21,000

b. Average cost per clerical employee per year:

Salary:	$7,000
Fringe Benefits:	1,500
Miscellaneous:	500
Total	$9,000

Recommended staff increases and estimated budget are summarized below:

Staffing

	Staff begin FY		Staff to be added	
FY	Prof.	Clerical	Prof.	Clerical
74	15	8	-	-
75	15	8	15	5
76	30	13	9	3
77	39	16	9	3
78	48	19	8	3

Budget

FY	Additional Funds Needed for FY	Estimated Program Costs for FY
74	-	$369,200 (Actual)
75	$360,000	$729,200
76	$216,000	$945,000
77	$216,000	$1,161,200
78	$195,000	$1,356,200

Up to Four-fold budget increases are recommended over the next four years for the Water Supply Program. It may be said that compared to a fully satisfactory Water Supply Program, present expenditure of funds in Florida is only about one-fourth of what is needed for adequate protection of public health.

Laboratory

Bacteriological Laboratory Services

Records maintained by the Division of Health have indicated that approximately 180,000 bacteriological samples are performed annually by State and County Health Department laboratories. An additional unknown number of samples are analyzed by utility laboratories.

The Bureau of Sanitary Engineering's budget includes no funds for laboratory support. It is not possible to precisely determine the cost of these laboratory services since drinking water bacteriology is not separated from other Division of Health bacteriology.

For purposes of rough estimation, however, the cost to analyze one sample has been variously estimated at $2 to $5. Arbitrarily assigning an average cost of $3 per sample, it can be estimated that present bacteriological services are valued at approximately $540,000.

Estimates of additional bacteriological samples needed for full surveillance of all public water systems were made in previous sections. Based on the estimated need for approximately 165,000 additional analyses annually, it can be seen that approximately $495,000 will be needed to support the phased increases in public water system surveillance recommended in this report.

Chemical Laboratory Services

It has been estimated that a minimum of 640 complete chemical analyses are needed each year to maintain surveillance over existing public water systems. The number of analyses needed would be expected to grow at least five percent per year. In addition, as overall Water Supply Program surveillance is established over small public water systems, these systems may eventually require as many as 1000 complete chemical analyses each year. Analyses for pesticides, organics, and radiochemical constituents will also be needed for complete chemical surveillance, although in smaller numbers.

Approximate costs for the minimum analytical work recommended are estimated as follows, based on $180* per sample for a complete analysis.

640 samples x $180/sample = $115,200

Additional costs for special analyses, such as for pesticides, organics, or radio-nuclides, are not estimated on a per sample basis because their numbers are expected to be small. Nevertheless, approximately one man-year of staff chemist time is estimated to be needed. This will add approximately $20,000 per year to the cost of chemical surveillance.

It is therefore estimated that at least $135,000 are needed annually to support a satisfactory chemical surveillance program, and up to an additional $180,000 are needed for full surveillance of small public water supplies.

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*The "Community Water Supply Study", U. S. Department of Health, Education, and Welfare, Public Health Service, July 1970, p. 63. This study used $150 per sample to estimate cost of chemical surveillance. This figure has been increased 5% per year to reflect increased costs.

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The following persons and groups made significant contributions to the successful completion of this study.

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APPENDIX A

TABLE I

PUBLIC WATER SYSTEMS STUDIED

SYSTEM NO.	SYSTEM NAME	POPULATION SERVED	AVERAGE DAILY DEMAND (MGD)	SOURCE	TREATMENT /1
1	Belle Glade	15,000	3.5	Lake Okeechobee	CSFDF1
2	Belleview	2,830	0.1	2 Wells	D
3	Camp-a-Wyle	700*	.035 est.	1 Well	D
4	Castle Villa	640	.064 est.	1 Well	AD
5	Cherry Lake	560	.05 est.	6 Wells	None
6	Edgewater	4,000	.37	2 Wells	2AD
7	Everglades	470	.05 est.	2 Wells	AD
8	Greater Pine Is. (Matlacha)	4,000	.65	12 Wells	AD
9	Greenwood	400	.04 est.	1 Well	D (Not Used)
10	High Point MHP	900	.09 est.	1 Well	D
11	Hollywood	70,000	14	19 Wells	CSFD
12	Keaton Beach	200	.014	2 Wells	None
13	Kendall Estates**	360	.053	1 Well	D
14	Lake Adrian TP	150	.015 est.	1 Well	AFD
15	Lakeport Water Authority	780	.035	1 Well	CSFD
16	Lakeside Estates	1,350	1.0	2 Wells	AD

TABLE I (Cont'd)

PUBLIC WATER SYSTEMS STUDIED

SYSTEM NO.	SYSTEM NAME	POPULATION SERVED	AVERAGE DAILY DEMAND (MGD)	SOURCE	TREATMENT /1
17	Magnolia Sp. Apt.	1,450	.14 est.	1 Well	D
18	Miami	800,000***	160	50 Wells	CSFDRFl
19	Oakland Park	19,000	2.65	City of Ft. Lauderdale	N.A.
20	Oldsmar	2,080	.30	City of St. Petersburg	N.A.
21	Quincy	8,600	1.3	Quincy Creek	CSFD
22	Port St. Joe	4,700	0.65	Chipola & Apalachicola R.	CSFD
23	Pensacola	150,000	19	22 Wells	DL
24	St. Augustine	14,000	2.6	15 Wells & Inf. Gallery	CSFD
25	Sebring	12,000	3.0	5 Wells	AD
26	Southgate	10,300	1.0	10 Wells & City of Sarasota	AD
27	Spring Lake Manor	133	.014	1 Well	D
28	Tallahassee	80,000	14.8	13 Wells	D
29	Tampa	300,000	51.3	Hillsborough R. & 4 Wells	CSFD
30	White Springs	900	.05	2 Wells	AD

*Estimate for peak season
**Well abandoned and system connected to Miami-Dade 8-30-73
***About 50% are customers of systems which obtain water wholesale from Miami

/1
A - Aeration
C - Coagulation
S - Sedimentation
F - Filtration
D - Disinfection
L - Lime
Fl - Fluoridation
R - Recarbonation
Z - Zeolite Filter

APPENDIX A

TABLE II

PUBLIC WATER SYSTEM BACTERIOLOGICAL SURVEILLANCE

SYSTEM NO.	BACTERIOLOGY LAB		BACTERIOLOGICAL SAMPLING - FY 73				BACTERIOLOGICAL QUALITY
	Lab. Used	Certification	Min. Req/Mo.	Mo. Min. Not Met	Range	Mo/No Samples	Months Fail DWS
1	Plant & State	None & State	16	0	55-105	0	0
2	County H. D.	None	3	4	0-6	4	1
3	State	State	2	0	3-4	0	3
4	State	State	2	2	0-3	2	2
5	State	State	2	7	0-5	7	2
6	State	EPA	5	6	2-9	0	6
7	State	State	2	2	0-3	2	0
8	County H. D.	None	5	1	4-8	0	0
9	State	State	2	11	0-2	9	0
10	State	State	2	4	0-3	4	1
11	Plant	State	80	5	72-128	0	0
12	State	State	2	11	0-2	10	0
13	State	State	2	11	0-2	8	0
14	State	State	2	12	0	12	-
15	State	State	2	0	3-6	0	1
16	State	EPA	2	2	0-3	2	0

TABLE II (Cont'd)

PUBLIC WATER SYSTEM BACTERIOLOGICAL SURVEILLANCE

SYSTEM NO.	BACTERIOLOGY LAB		BACTERIOLOGICAL SAMPLING - FY 73				BACTERIOLOGICAL QUALITY
	Lab. Used	Certification	Min. Req/Mo.	Mo. Min. Not Met	Range	Mo/No Samples	Months Fail DWS
17	State	EPA	2	6	0-4	6	0
18	Plant & State	State	210	3	190-364	0	0
19	County H. D.	State	24	12	12-15	0	0
20	County H. D.	State	2	0	5-7	0	0
21	State	State	10	9	6-12	0	0
22	Plant	State	6	0	107-148	0	0
23	State	State	140	0	156-200	0	0
24	Plant & State	None & EPA	16	0	17-28	0	0
25	State	State	14	12	0-5	4	1
26	County H. D.	None	12	12	5-5	0	2
27	State	State	2	4	0-2	4	0
28	State	State	90	0	101-119	0	0
29	Plant	State	190	0	297-379	0	0
30	State	State	2	11	0-2	2	1

APPENDIX A

TABLE III

PUBLIC WATER SYSTEM RELIABILITY RATING

SYSTEM	SOURCE			TREATMENT PLANT				DISTRIBUTION SYSTEM		RATING /1
NO.	QUANTITY	QUALITY	PROTECTION	FACILITIES	OPERATION	MAINTENANCE	TESTS & RECORDS	PRESSURE	STORAGE	0 to 10
1	OK	X	OK	X	X	OK	OK	OK	OK	3
2	OK	OK	OK	X	OK	X	X	OK	OK	3
3	OK	OK	OK	X	OK	OK	X	OK	X	3
4	OK	OK	OK	X	X	OK	X	OK	X	4
5	X	OK	OK	X	OK	X	X	X	X	7
6	OK	OK	OK	X	X	OK	X	OK	OK	3
7	OK	X	OK	X	OK	X	X	OK	OK	4
8	OK	X	OK	X	X	X	OK	OK	OK	4
9	OK	OK	X	X	X	OK	X	OK	X	5
10	OK	OK	OK	X	OK	OK	X	OK	X	3
11	OK	OK	OK	OK	OK	OK	OK	OK	OK	0
12	OK	OK	X	X	OK	OK	X	OK	X	4
13	-	-	-	-	-	OK	OK	OK	OK	0
14	OK	X	OK	X	OK	X	X	OK	X	5
15	OK	X	OK	X	X	OK	X	OK	OK	4
16	OK	OK	OK	OK	OK	X	OK	OK	X	2

TABLE III (Cont'd)

PUBLIC WATER SYSTEM RELIABILITY RATING

SYSTEM	SOURCE			TREATMENT PLANT				DISTRIBUTION SYSTEM		RATING /1
NO.	QUANTITY	QUALITY	PROTECTION	FACILITIES	OPERATION	MAINTENANCE	TESTS & RECORDS	PRESSURE	STORAGE	0 to 10
17	OK	OK	OK	X	OK	OK	X	OK	OK	2
18	OK	OK	OK	OK	X	OK	OK	OK	OK	1
19	-	-	-	-	-	OK	OK	OK	OK	0
20	-	-	-	-	-	OK	X	OK	OK	1
21	OK	OK	X	X	OK	OK	OK	OK	X	3
22	OK	OK	OK	X	X	OK	OK	OK	OK	2
23	OK	OK	OK	OK	X	OK	OK	OK	X	2
24	OK	OK	OK	X	OK	X	OK	OK	X	3
25	OK	OK	OK	OK	X	X	X	OK	X	4
26	OK	OK	OK	X	OK	OK	X	OK	OK	2
27	OK	OK	OK	X	X	OK	X	OK	X	4
28	OK	OK	OK	OK	OK	OK	OK	OK	X	1
29	X	OK	OK	X	OK	OK	OK	X	OK	4
30	OK	X	OK	X	OK	OK	X	OK	OK	3

X - Deficient
OK - Satisfactory
/1 - Represents number and relative seriousness of deficiencies. Deficiency in source quantity counted two points.
All others counted one point.
"0" indicates least risk
"10" indicates most risk

APPENDIX A

TABLE IV

PUBLIC WATER SYSTEM QUALITY AND SURVEILLANCE RATING

SYSTEM	BACTERIOLOGICAL		CHEMICAL /1			QUALITY PROTECTION		RATING /2
NO.	QUALITY	MONITORING	QUAL-MAND.	QUAL-REC.	MONITORING	CL_2 RESIDUAL	CROSS-CONN.	0 to 10
1	OK	OK	OK	X TDS, color	OK	X	X	3
2	X	X	OK	OK	X	X	X	7
3	X	OK	OK	OK	OK	OK	X	3
4	X	X	OK	OK	X	X	X	7
5	X	X	OK	OK	X	X	X	7
6	X	X	OK	OK	OK	OK	X	5
7	IND.	X	OK	X chlorides	X	OK	X	6
8	OK	OK	OK	X TDS, hard	OK	OK	X	2
9	IND.	X	OK	OK	X	X	X	6
10	X	X	OK	OK	X	OK	X	6
11	IND.	X	OK	OK	OK	OK	X	4
12	IND.	X	OK	OK	X	X	X	6
13	IND.	X	OK	OK	OK	OK	X	4
14	IND.	X	OK	X iron	X	OK	X	6

TABLE IV (Cont'd)

PUBLIC WATER SYSTEM QUALITY AND SURVEILLANCE RATING

SYSTEM NO.	BACTERIOLOGICAL		CHEMICAL /1			QUALITY PROTECTION		Rating /2
	QUALITY	MONITORING	QUAL-MAND.	QUAL-REC.	MONITORING	CL_2 RESIDUAL	CROSS-CONN.	0 to 10
15	X	OK	OK	X TDS, chloride	OK	X	X	5
16	IND.	X	OK	OK	X	OK	X	5
17	IND.	X	OK	OK	X	OK	X	5
18	OK	X	OK	OK	OK	X	OK	3
19	IND.	X	OK	OK	OK	OK	X	4
20	OK	OK	OK	OK	OK	X	X	2
21	IND.	X	OK	OK	OK	OK	X	4
22	OK	OK	OK	OK	OK	OK	X	1
23	OK	OK	OK	OK	OK	X	X	2
24	OK	OK	OK	OK	X	OK	X	2
25	X	X	OK	OK	OK	X	X	6
26	X	X	OK	OK	OK	OK	X	5
27	IND.	X	OK	OK	X	OK	X	5
28	OK	OK	OK	OK	OK	OK	OK	0

TABLE IV (Cont'd)

PUBLIC WATER SYSTEM QUALITY AND SURVEILLANCE RATING

SYSTEM NO.	BACTERIOLOGICAL		CHEMICAL /1			QUALITY PROTECTION		Rating /2 0 to 10
	QUALITY	MONITORING	QUAL-MAND.	QUAL-REC.	MONITORING	CL_2 RESIDUAL	CROSS-CONN.	
29	OK	OK	OK	OK	OK	OK	X	1
30	X	X	OK	X iron	X	OK	X	7

IND. = indeterminant - two or more months with no bacteriological record, hence quality is unknown.
X = deficient
OK = satisfactory
/1 = only constituents failing to meet standards are noted.
/2 = represents deficiencies in seven categories listed in Table. Deficiency in bacteriological quality or monitoring counted two points each, as did failing mandatory chemical standard. Indeterminant bacteriological quality counted one point.
"0" indicates least risk
"10" indicates most risk

APPENDIX A

TABLE V

SUMMARY OF SYSTEM DEFICIENCIES

SYSTEM NO.	WATER QUALITY		SURVEILLANCE			FACILITIES RELIABILITY RATING	QUALITY AND SURVEILLANCE RATING
	BACTERIAL	CHEMICAL	BACTERIAL	CHEMICAL	SHD		
1	OK	X_r	OK	OK	OK	3	3
2	X	OK	X	X	X	3	7
3	X	OK	OK	OK	X	3	3
4	X	OK	X	X	OK	4	7
5	UNK.	OK	X	X	OK	7	7
6	X	OK	X	OK	OK	3	5
7	UNK.	X_r	X	X	X	4	6
8	OK	X_r	OK	OK	OK	5	2
9	UNK.	OK	X	X	X	5	6
10	X	OK	X	X	X	3	6
11	UNK.	OK	X	OK	OK	0	4
12	UNK.	OK	X	X	X	4	6
13	UNK.	OK	X	OK	OK	0	4
14	UNK.	X_r	X	X	OK	5	6

TABLE V (Cont'd)

SUMMARY OF SYSTEM DEFICIENCIES

SYSTEM NO.	WATER QUALITY		SURVEILLANCE			FACILITIES RELIABILITY RATING	QUALITY AND SURVEILLANCE RATING
	BACTERIAL	CHEMICAL	BACTERIAL	CHEMICAL	SHD		
15	X	X_r	OK	OK	OK	4	5
16	UNK.	OK	X	X	X	2	5
17	UNK.	OK	X	X	X	2	5
18	OK	OK	OK	OK	OK	1	3
19	UNK.	OK	X	OK	X	0	4
20	OK	OK	OK	OK	X	1	2
21	UNK.	OK	X	OK	OK	3	4
22	OK	OK	OK	OK	OK	2	1
23	OK	OK	OK	OK	OK	2	2
24	OK	OK	OK	X	OK	3	2
25	X	OK	X	OK	OK	4	6
26	X	OK	X	OK	OK	2	5
27	UNK.	OK	X	X	OK	4	5
28	OK	OK	OK	OK	OK	1	0

TABLE V (Cont'd)

SUMMARY OF SYSTEM DEFICIENCIES

SYSTEM NO.	WATER QUALITY		SURVEILLANCE			FACILITIES RELIABILITY RATING	QUALITY AND SURVEILLANCE RATING
	BACTERIAL	CHEMICAL	BACTERIAL	CHEMICAL	SHD		
29	OK	OK	OK	OK	OK	4	1
30	X	X_r	X	X	X	3	7

OK = Satisfactory.
X = Deficiency.
UNK. = Unknown - indeterminant because of insufficient numbers of samples.
X_r = One or more chemical constituents failed the recommended (esthetic) limits of the Federal Drinking Water Standards.

APPENDIX B

FLORIDA SMALL PUBLIC WATER SUPPLIES

Introduction

Public water supplies are defined in the Statute and in the Rules as including all supplies which make water available to the public. The only supplies excluded from regulation by the Florida Division of Health would be those serving a single family dwelling. The Rules do not require that plans and specifications be submitted for systems serving fewer than 25 residents and therefore these smaller systems do occupy a different status from larger systems. Examples of such systems include small trailer parks and subdivisions, restaurants, campgrounds and parks, labor camps, and child care centers.

Small public supplies may expose a large number of people to drinking water during the course of a year. It is, therefore, appropriate that these supplies be included in the State program and in this evaluation.

Counties Surveyed

Four counties were selected to be surveyed and sampled in order to evaluate the present condition of Florida small public water systems and to ascertain if additional health agency surveillance may be necessary to assure public health protection. These counties were Santa Rosa in northwestern Florida, Seminole, Polk, and Sarasota counties in central Florida. It was generally agreed that data assembled from these four counties could reasonably describe the condition of small public water systems in Florida. Polk County was the only county to have a full time Sanitary Engineer heading the water supply surveillance activity in the County Health Department.

Santa Rosa County is located at the northwestern section of Florida's Panhandle; very close to the Florida-Alabama line. The present land form is hilly to flat due to irregular erosion, making Santa Rosa predominantly suited for agriculture and petroleum exploration.

The subsurface structure from which Santa Rosa County obtains its groundwater is known as a shallow sand and gravel aquifer. The quality water from the sand and gravel aquifer is known to be highly mineralized in some areas of the county.

Sarasota County includes an area located in southwestern coastal Florida. The development of the present land surface has been brought about almost entirely by transgression-regression seas, therefore making Sarasota County predominantly suited for agricultural, truck, livestock, and citrus farming. Sarasota County is developing at a rapid rate and is geared to retirement and year-round tourist attractions. The principal source of water supply in coastal Florida is the Floridan Aquifer. Groundwater levels are known to fluctuate seasonally in response to utilization and rainfall. Water quality depends largely on depth. The water obtained from wells not exceeding 90' usually provide waters of a fair quality. The county's water supply in certain areas are extremely high in sulfides.

Polk County is located in south central Florida. The development of the present land surface has been brought about by regressing seas. Polk County's economic activities include heavy citrus farming, and limited agricultural truck farming. The economic growth of Polk County make groundwater pumpage increasingly large and in some areas very limited. In many parts of northern Polk County, water levels continue to decline. Water well construction in Polk County is more complex than in the other counties studied. Several unknown geological factors forbid the drilling of shallow wells in the northern portion of the county.

Seminole County is located in southeast central Florida. The county's economic activities are limited to citrus and truck farming. The chief source of groundwater supply is from the Floridan aquifer. Groundwater levels in Seminole County are generally stable. Water quality in the immediate area is usually good, even though some intermediate sulfides exist.

Evaluation Methods

When the four counties were selected for study, the number of small public systems in each county was unavailable. It was decided that approximately 20 systems in each county would be randomly selected to present a cross-section of this type supply in the county. A total of 78 supplies were evaluated in all. No selection was needed in Santa Rosa County since only 13 small public supplies could be located.

The study attempted to establish an estimate of the number of persons who may drink water from a small public supply during a year. In most cases, the number of persons was not a matter of record, and estimates were necessary. In addition, the probability that water will be consumed differs between overnight guest at a motel and visitors at a day facility such as a picnic area. Nevertheless, visitors to both facilities are dependent upon the water served as the only water available. All visitors were included, therfore, in defining the population at risk.

It was felt that unavailability of dependable small public system inventories and the small number of counties and systems studied compared to actual numbers makes inadvisable statewide numerical projections of small public systems and people exposed annually. However, a very rough estimate was developed. Assumptions employed in arriving at this number are included at the end of this appendix.

Each of the 78 supplies was inspected by an EPA geologist. Technical data was gathered and the visible portions of the system were evaluated. A single bacteriological sample was collected and analyzed for fecal and total coliform organisms. A chemical sample was collected and analyzed for trace metals. Chlorine residual measurements were taken if chlorination equipment was present.

Principal features of the small public systems surveyed are presented in Table 1. This tabulation includes information on the number of people served, treatment provided, surveillance by health agency, source, quality of water produced, and overall acceptability of the system from the public health standpoint. Judgement was necessary to rate treatment adequacy and freedom from sanitary defects. Emphasis in rating the system was placed upon results of bacteriological testing and presence of chlorinating equipment and chlorine residual. In this report, any system not demonstrating evidence of continuous disinfection was not rated fully satisfactory. A system considered satisfactory in other respects but not having chlorinating equipment or chlorine residual was considered "questionable."

Conclusions

1. Based on the Bureau of Sanitary Engineering estimate that 5,000* small public systems exist in the State, and the estimate developed in this study that 11,800 persons are exposed to each small public supply each year, it follows that as many as 59,000,000 may be dependent annually on a small public supply

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* This number was not verified by the study due to general unavailability of adequate files and inventory data located in some County Health Departments. In addition, counties selected were not among the heaviest populated where the largest number of small public systems are probably located.

for drinking water. Estimation methods, however, may count an individual repeatedly if he is exposed to more than one small public system. In any case, the fact that the health of a huge number of persons may be affected by the quality of water requires that a stronger program for supervision of these supplies be established.

2. Of the 78 small public water systems surveyed and sampled, a significant percentage were providing water with unsatisfactory bacteriological or chemical quality:
   a. 2.6 percent showed the presence of more than 4 coliform organisms per 100 ml of water, thus failing the bacteriological standard. These systems serve an estimated 63,875 persons annually.
   b. All systems met mandatory (health) chemical standards.
   c. 36 percent failed one or more recommended (esthetic) chemical standards. As a result, approximately 235,912 persons annually are provided esthetically deficient water.

3. Only 3.8 percent of the small public water systems surveyed could be given an overall "satisfactory" rating.

4. 51 percent of the systems surveyed had not been visited by a health agency official during the previous two years. In most cases, the visit consisted of collection of a water sample and did not include significant inspection of facilities or operational

practices. Most health agency surveillance was provided by county sanitarians who are not fully trained in maintenance and operation of water treatment facilities.

Recommendations

1. Provide supplementary training in small water system technology and public health protection for all county sanitarians or others who are involved in official public agency surveillance of Class III supplies.

2. Promote and require mandatory disinfection of all public water supply systems.

3. Include small public supplies in a State-supervised water supply program which should include:
   - a. Inspection of facilities and operation at least annually.
   - b. Submission of at least two bacteriological samples per month with appropriate engineering review and follow-up in the event quality is unsatisfactory.
   - c. Promulgation and enforcement of minimum standards for construction, protection of source, size and type storage facility, disinfection equipment and distribution system.
   - d. Chemical surveillance, beginning with supplies exposing larger numbers of people.

4. Coordinate and edit a complete statewide inventory of small public systems.

Assumptions for Calculating Annual Population at Risk

1. Family campgrounds and travel trailer parks operate 120 days per year at 50 percent capacity. Average length of stay is three days per family with an average of four persons per family.

2. State parks and roadside rest areas operate 365 days per year. Visitors return an average of four times per year.

3. Service stations operate 365 days per year. Customers average three per automobile and return an average of three times per year.

4. Trailer parks and subdivisions risk only residents.

5. Lunch counters and bars are open 300 days per year. Customers average four time seating capacity and average 40 visits per year.

6. Motels operate 180 days a year at 60 percent capacity. The average customer consists of three people who stay two days.

7. Tourist and truck stop restaurants operate 300 days per year. Daily customers average six times seating capacity and customers average four visits per year.

8. Church camps and similar institutions operate eight sessions annually at 80 percent capacity.

9. Labor camps are occupied at 95 percent capacity by two groups each year. The average family consists of five persons.

10. Child care centers expose only the number of people for which the facility is designed.

Estimated Annual Population at Risk

Total small public supplies in State: 5,000

(estimate provided by Bureau of Sanitary Engineering, Florida Division of Health)

Average population exposed to small public supply each year:

County	No. Systems Surveyed	Estimated Annual Population
Polk	23	151,499
Santa Rosa	13	125,240
Sarasota	22	298,319
Seminole	20	345,095
	78	920,153

920,153/78 = 11,800

Total estimated persons exposed statewide:

11,800 x 5,000 = 59,000,000

TABLE I - SUMMARY OF PRINCIPLE FEATURES OF SUPPLIES SURVEYED

POLK COUNTY SUPPLY	POPULATION SERVED		SOURCE			TREATMENT			SURVEILLANCE	QUALITY			RATING		
	Est. Daily Pop. at Risk	Est. Annual Pop. at Risk	Adeq. Qty.	Type	Free From Visible Sanitary Defect	Equip. to Chlor.	Chlor. Resid. Detect.	Addit. Treat.	Health Agcy. Visit In Prev. 2 Yrs.	MPN Total Coli.	MPN Fecal Coli.	Chem.	Satis.	Ques.	Unsatis
Beasley's Trailer Park	12	12	Yes	W-100'	Yes	No	-	-	Yes	-2.2	-2.2	Fe-0.84		X	
Campin Aires Campground	258	5,160	Yes	W-450'	Yes	Yes	0	-	Yes	-2.2	-2.2	Fe-0.6		X	
Copper Top Restaurant	160	67,500	Yes	W-405'	Yes	No	-	-	Yes	-2.2	-2.2	OK		X	
Dick's Restaurant & Trailer Pk.	420	27,060	Yes	W-168'	Yes	No	-	-	Yes	-2.2	-2.2	OK		X	
Doris's Playschool	20	20	Yes	W-97'	Yes	No	-	-	Yes	-2.2	-2.2	OK		X	
Edd's Trailor Park	24	24	Yes	W-110'	Yes	No	-	-	Yes	-2.2	-2.2	OK		X	
Fish Haven Lodge	77	7,026	Yes	W-150'	Yes	No	-	-	Yes	-2.2	-2.2	OK		X	
Fletcher Trailer Pk. & Fish Camp	18	18	Yes	W-125'	Yes	No	-	-	Yes	-2.2	-2.2	OK		X	
Gibson's Trailer Park	57	57	Yes	W-156'	Yes	No	-	-	Yes	-2.2	-2.2	OK		X	
Hall's Trailer Park	18	18	Yes	W-258'	Yes	No	-	-	Yes	-2.2	-2.2	OK		X	
Illinois Trailer Park	21	21	Yes	W-82'	Yes	No	-	-	Yes	-2.2	-2.2	Fe-.59		X	
KOA Campground	243	4,880	Yes	W-705'	Yes	No	-	-	Yes	-2.2	-2.2	Fe-0.46		X	
Lake Wales Motel & Restaurant	348	38,970	Yes	W-700'	No	No	-	-	Yes	-2.2	-2.2	OK		X	
McGrady's Trailer Park	24	24	Yes	W-220'	Yes	No	-	-	Yes	-2.2	-2.2	OK		X	
Palmer Trailer Park	12	12	Yes	W-123'	Yes	No	-	-	Yes	-2.2	-2.2	OK		X	
Pasco's Labor Camp	39	370	Yes	W-320'	Yes	Yes	0	-	Yes	-2.2	-2.2	OK		X	
Robart's Mobile Home Park	24	24	Yes	W-200'	Yes	No	-	-	Yes	-2.2	-2.2	OK		X	
Sandy Cove Trailer Park	36	36	Yes	W-800'	Yes	No	-	-	Yes	-2.2	-2.2	OK		X	
Schoupp Trailer Park	15	15	Yes	Well	Yes	No	-	-	Yes	-2.2	-2.2	Fe-.61		X	
Spivey's Trailer Park	21	21	Yes	W-206	Yes	No	-	-	Yes	-2.2	-2.2	Fe-.61		X	
Stan's Trailer Park	21	21	Yes	W-135'	Yes	No	-	-	Yes	-2.2	-2.2	OK		X	
Young's Ridge Trailer Park	30	30	Yes	W-180'	Yes	No	-	-	Yes	-2.2	-2.2	Fe-2.5 Zn-8.0		X	
Young's Labor Camp	19	180	Yes	W-250'	Yes	No	-	-	Yes	-2.2	-2.2	OK		X	
TOTAL	1,917	151,499													

TABLE I - SUMMARY OF PRINCIPLE FEATURES OF SUPPLIES SURVEYED

SANTA ROSA COUNTY SUPPLY	POPULATION SERVED		SOURCE			TREATMENT			SURVEILLANCE	QUALITY			RATING		
	Est. Daily Pop. at Risk	Est. Annual Pop. at Risk	Adeq. Qty.	Type	Free From Visible Sanitary Defect	Equip. to Chlor.	Chlor. Resid. Detect.	Addit. Treat.	Health Agcy. Visit In Prev. 2 Yrs.	MF Total Coli.	MF Fecal Coli.	Chem.	Satis.	Ques.	Unsatis.
A. C. Lunsford Trailer Pk.	21	21	Yes	W-67'	Yes	No	-	-	Yes	-1	-1	Fe-.42		X	
Blackwater River State Pk.	150	13,689	Yes	W-45'	Yes	No	-	-	No	-1	-1	Fe-4.6 Zn-18.5 Mn-0.79		X	
Campbell Trailer Park	30	30	Yes	Well	Yes	No	-	-	Yes	-1	-1	Fe-.47		X	
Cedar Pine Trailer Park	81	81	Yes	W-120'	Yes	No	-	-	Yes	-1	-1	OK		X	
I-10 Roadside Park (E)	200	18,250	Yes	W-192'	Yes	No	-	-	Unk.	-1	-1	Fe-.90		X	
I-10 Roadside Park (W)	200	18,250	Yes	W-192'	Yes	No	-	-	Unk.	-1	-1	Fe-1.2 Zn-9.3		X	
Nichol's Lake Campground	126	2,520	Yes	W-65'	Yes	No	-	-	Unk.	-1	-1	OK		X	
Parkmore Restaurant	360	27,000	Yes	W-125'	Yes	No	-	-	Unk.	-1	-1	OK		X	
Parkmore Trailer Park	12	12	Yes	W-105'	Yes	No	-	-	Yes	-1	-1	Fe-.79		X	
Pond Creek Wayside Park	200	18,250	Yes	W-130'	Yes	No	-	-	Unk.	-1	-1	Fe-.90		X	
Satellite Restaurant	330	24,750	Yes	W-80'	Yes	No	-	-	Unk.	-1	-1	Fe-.59		X	
S. S. Submarine Sand.	112	840	Yes	W-105'	Yes	No	-	-	Yes	-1	-1	Fe-.41		X	
Tent City Tr. Pk. & Campground	65	1,547	Yes	Well	Yes	No	-	-	No	-1	-1	Fe-.48 Zn-18.2		X	
TOTAL	1,887	125,240													

TABLE I - SUMMARY OF PRINCIPLE FEATURES OF SUPPLIES SURVEYED

SARASOTA COUNTY SUPPLY	POPULATION SERVED		SOURCE			TREATMENT			SURVEILLANCE	QUALITY			RATING		
	Est. Daily Pop. at Risk	Est. Annual Pop. at Risk	Adeq. Qty.	Type	Free From Visible Sanitary Defect	Equip to Chlor.	Chlor. Resid. Detect.	Addit. Treat.	Health Agcy. Visit In Prev. 2 Yrs.	MPN Total Coli.	MPN Fecal Coli.	Chem.	Satis.	Ques.	Unsatis.
Barney's Food and Bar	192	1,440	Yes	W-80'	Yes	Yes	0	Yes	No	-2.2	-2.2	Fe-1.2		X	
Be Ments Cafe	912	68,400	Yes	W-90'	Yes	Yes	0	Yes	No	-2.2	-2.2	Fe-.84		X	
Bill's Sandwich Shop	288	2,160	Yes	W-165'	Yes	Yes	0	-	No	-2.2	-2.2	OK		X	
Booker Bar & Sandwich	72	540	Yes	W-175'	Yes	No	-	-	No	-2.2	-2.2	OK		X	
Dick's Shell Oil	180	21,900	Yes	W-80'	Yes	No	-	-	No	-2.2	-2.2	Fe-1.2		X	
Edward's American Oil	150	18,250	Yes	W-150'	Yes	No	-	-	No	-2.2	-2.2	OK		X	
F.A.M.E. Child Care	43	54	Yes	W-180'	Yes	Yes	0	-	Yes	-2.2	-2.2	OK		X	
Hong Kong Restaurant	276	20,700	Yes	W-80'	Yes	Yes	10	Yes	Yes	-2.2	-2.2	OK	X		
Hoosier's Inn	168	1,260	Yes	W-80'	Yes	No	-	-	No	-2.2	-2.2	Fe-.96		X	
Joe's Handy Stop	120	10,950	Yes	W-110'	Yes	No	-	-	Yes	-2.2	-2.2	OK		X	
Kelties Inn	296	2,220	Yes	W-75'	Yes	Yes	0	-	Yes	-2.2	-2.2	OK		X	
King's Restaurant	900	67,500	Yes	W-90'	Yes	Yes	0	Yes	No	-2.2	-2.2	OK		X	
Loria's Standard Station	110	10,038	Yes	W-120'	Yes	No	-	-	No	-2.2	-2.2	OK		X	
Pixie Land Child Care	14	14	Yes	W-85'	Yes	No	-	-	Yes	-2.2	-2.2	Mn-7.7		X	
Sisters Sundries	112	840	Yes	W-180'	Yes	No	-	-	Yes	-2.2	-2.2	Fe-.60		X	
Starlite Restaurant	372	27,900	Yes	W-80'	Yes	No	-	-	No	-2.2	-2.2	Fe-2.3		X	
The Landing Food Bar	48	368	Yes	W-60'	Yes	Yes	0	-	No	-2.2	-2.2	Fe-.36		X	
The Palms Restaurant	234	17,550	Yes	W-80'	Yes	No	-	-	Unk.	-2.2	-2.2	OK		X	
Travis Motel	48	2,610	Yes	W-86'	Yes	Yes	0	-	Unk.	-2.2	-2.2	OK		X	
Tropic Bay Station	110	10,038	Yes	W-110'	Yes	No	-	-	No	-2.2	-2.2	OK		X	
Water's Gulf Station	140	12,775	Yes	W-175'	Yes	No	-	-	No	-2.2	-2.2	OK		X	
Woody's Food and Bar	108	810	Yes	W-180'	Yes	No	-	-	Yes	-2.2	-2.2	OK		X	
TOTAL	4,893	298,31													

TABLE I - SUMMARY OF PRINCIPLE FEATURES OF SUPPLIES SURVEYED

	POPULATION SERVED		SOURCE			TREATMENT			SURVEILLANCE	QUALITY			RATING		
SEMINOLE COUNTY SUPPLY	Est. Daily Pop. at Risk	Est. Annual Pop. at Risk	Adeq. Qty.	Type	Free From Visible Sanitary Defect	Equip. to Chlor.	Chlor. Resid. Detect.	Addit. Treat.	Health Agcy. Visit In Prev. 2 Yrs.	MF Total Coli.	MF Fecal Coli.	Chem.	Satis.	Ques.	Unsatis.
Augie's Hickory House	160	1,200	Yes	W-120'	Yes	No	-	-	Unk.	-1	-1	OK		X	
Bill's Tavern	120	900	Yes	Well	Yes	No	-	-	Unk.	-1	-1	OK		X	
Citrus Council Girl Scout	50	320	Yes	W-240'	Yes	No	-	-	Yes	-1	-1	OK		X	
Enco Station	300	36,500	Yes	W-150'	Yes	No	-	-	Unk.	-1	-1	OK		X	
Fiesta Lounge	140	1,050	Yes	Well	Yes	No	-	-	Unk.	3	-1	OK		X	
Five Point Club	18	120	Yes	Well	Yes	No	-	-	Unk.	-1	-1	FE-.66		X	
Fleet Reserve Club	25	180	Yes	Well	Yes	Yes	2.1	-	Unk.	-1	-1	OK	X		
Floyd's Standard Station	250	34,183	Yes	Well	Yes	No	-	-	Unk.	-1	-1	OK		X	
Frank's Oyster Bar	128	960	Yes	Well	Yes	No	-	-	Unk.	-1	-1	OK		X	
Glenn's Beer and Food	100	7,500	Yes	Well	Yes	No	-	-	Unk.	-1	-1	Fe-1.05		X	
Gulf Oil	275	33,458	Yes	Well	Yes	No	-	-	Unk.	-1	-1	OK		X	
Liars Lodge & Restaurant	180	13,500	Yes	Well	Yes	No	-	-	Unk.	-1	-1	OK		X	
Shanty Pub	120	400	Yes	W-220'	Yes	No	-	-	Yes	4	-1	Fe-1.9		X	
Shell Oil	300	36,500	Yes	Well	Yes	No	-	-	Unk.	-1	-1	OK		X	
Standard Oil	285	34,675	Yes	Well	Yes	No	-	-	Unk.	15	-1	OK			X
Stuckey's	350	42,583	Yes	W-200'	Yes	No	-	-	Unk.	-1	-1	OK		X	
Sunoco Station	280	34,066	Yes	W-286'	Yes	No	-	-	Unk.	-1	-1	OK		X	
Texaco Oil	240	29,200	Yes	Well	Yes	No	-	-	Unk.	7	-1	OK			X
Three Nation Restaurant	250	36,000	Yes	W-400'	Yes	Yes	1.8	-	Yes	-1	-1	OK	X		
Tom's Pizza	240	1,800	Yes	Well	Yes	No	-	-	Unk.	-1	-1	OK		X	
TOTAL	3,811	345,095													

APPENDIX C

ADEQUACY OF THE WATER FLUORIDATION CONTROL PROGRAM IN FLORIDA

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FLORIDA WATER SUPPLY PROGRAM EVALUATION

ADEQUACY OF THE WATER FLUORIDATION CONTROL PROGRAM IN FLORIDA

Introduction

The Florida Division of Health approves of the application of fluoride to public water supplies in the State as an important public health measure for the prevention of tooth decay. The recommended fluoride ion level is as prescribed in the 1962 Public Health Service Drinking Water Standards. Requirements for fluoridating public water supplies in the State are provided in the State of Florida Department of Health and Rehabilitative Services Division of Health Rules, Chapter 10D-4. The Division of Health, Bureau of Sanitary Engineering, Water Supply Section, is responsible for administering the provisions of the State fluoridation requirements. There is no State mandatory regulation in Florida requiring the fluoridation of public water supplies; however, Broward County, by referendum, adopted mandatory fluoridation but communities in the county may be excluded if decided by local referendum.

On September 1, 1973, sixteen public water supply systems (population served: 1.5 million) of a total of approximately 1800 public water supplies in the State1/ were reported fluoridating. Figure 1, Fluoridated Water Supply Systems in Florida, locates the sixteen supplies and Table I summarizes pertinent information on each fluoridated

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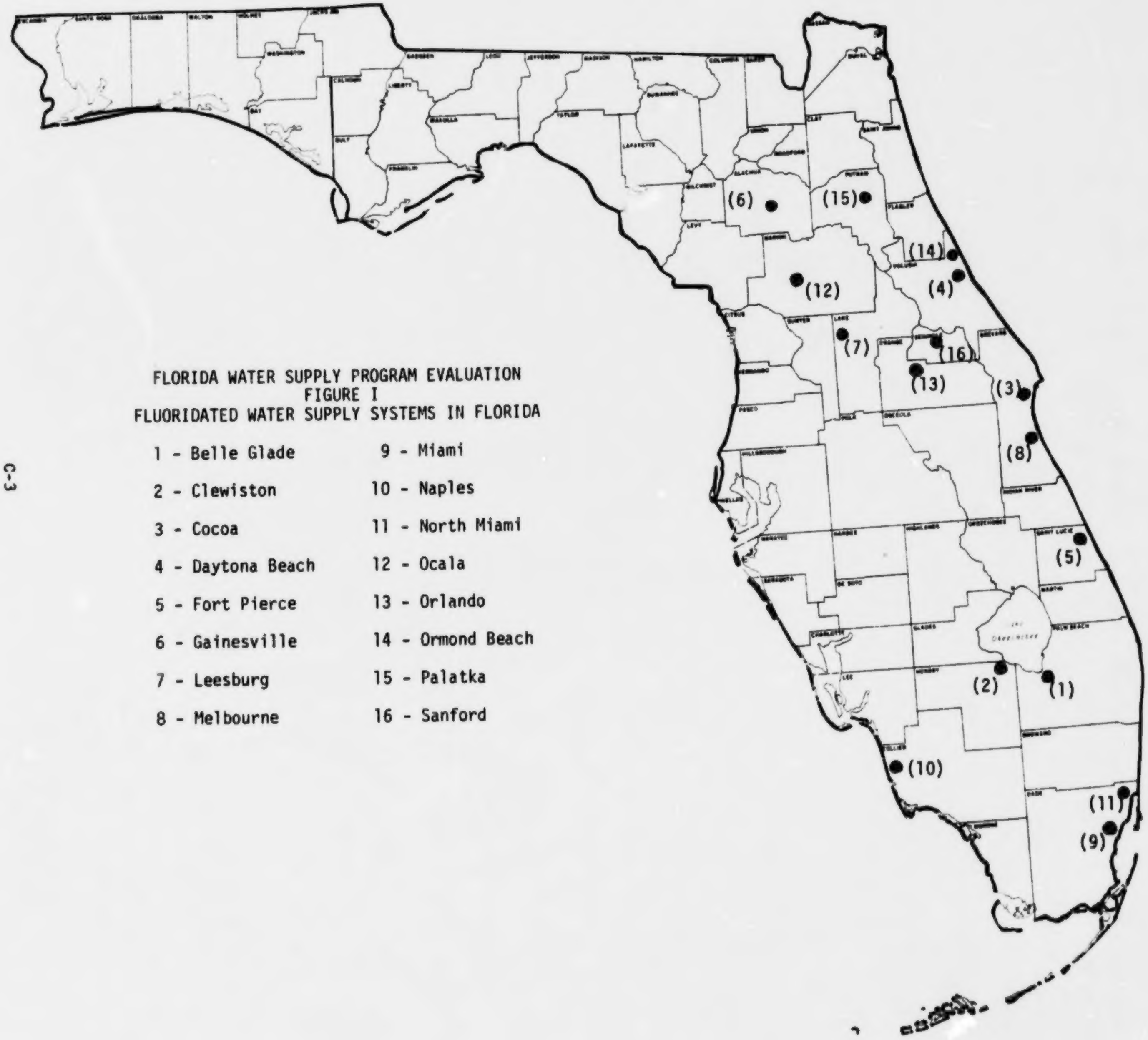
1/ Bureau of Sanitary Engineering estimate of public water supply systems serving 25 or more residents.



FLORIDA WATER SUPPLY PROGRAM EVALUATION
FIGURE I
FLUORIDATED WATER SUPPLY SYSTEMS IN FLORIDA

1 - Belle Glade
2 - Clewiston
3 - Cocoa
4 - Daytona Beach
5 - Fort Pierce
6 - Gainesville
7 - Leesburg
8 - Melbourne
9 - Miami
10 - Naples
11 - North Miami
12 - Ocala
13 - Orlando
14 - Ormond Beach
15 - Palatka
16 - Sanford

FLORIDA WATER SUPPLY PROGRAM EVALUATION
TABLE I
FLUORIDATED WATER SUPPLY SYSTEMS IN FLORIDA

Water Supply System	Location (County)	Date Of Fluoridation	Population Served	Source of Supply	Avg. Use (MGD)	Fluoride Compound	Type Of Feeder	Analysis Method	Test Equipment
Belle Glade	Palm Beach	2/56	15,000	Lake Okeechobee	3.5	VT	V-1	SS	T-1
Clewiston	Hendry	10/51	5,500	Lake Okeechobee	1.25	VS	V-4	S	T-2
Cocoa	Brevard	11/55	100,000	19 - Wells	18.0	VA	P-1	S	T-2
Daytona Beach	Volusia	1/66	70,700	14 - Wells	10.0	VS	V-6	S	T-6
Fort Pierce	Saint Lucie	6/63	35,000	24 - Wells	4.5	VS	V-2	S	T-2
Gainesville	Alachua	10/49	70,000	6 - Wells	15.0	VS	G-1	SS	T-1
Leesburg	Lake	2/70	16,000	9 - Wells	4.2	VS	G-2	S	T-2
Melbourne	Brevard	11/66	70,000	Lake Washington				S	T-2
North Plant					2.5	VS	V-4		
South Plant					6.5	VS	V-4		
Miami	Dade	4/52	800,000	50 - Wells	160.0				
Hilean						VS	G-2	MM	T-3
Orr						VS	G-1	MM	T-4
Preston						VS	G-1	MM	T-3
Naples	Collier	10/51	25,000	36 - Wells	8.0	VT	V-3	S	T-2
North Miami	Dade	3/69	55,000	15 - Wells	14.0 a/			MM	T-5
Westside Plant						VA	P-2		
Eastside Plant						VA	P-2		
Ocala b/	Marion	11/56	28,000	6 - Wells	4.43			SS	T-1
Plant #1						VA	P-1		
Plant #2						VS	G-1		
Orlando	Orange	11/56	190,000	21 - Wells	36.0			S	T-7
Highland						VS	G-3		
Pine Hills						VS	G-1		
Primrose						VS	G-1		
Kuhl						VS	G-1		
Conway						VS	G-2		
Martin						VS	G-1		
Kirkman						VS	G-4		
Ormond Beach c/	Volusia	8/61	15,000	14 - Wells	2.75	VS	V-5	SS	T-1
Palatka	Putnam	10/64	10,000	4 - Wells	2.0	VS	V-5	S	T-6
Sanford	Seminole	1/66	25,000	12 - Wells	4.0			S	T-6
Plant #1						VS	G-2		
Plant #2						VS	G-2		

Fluoride Compound
VA - Fluosilicic Acid
VS - Sodium Silicofluoride
VT - Sodium Fluoride

Analysis Method
S - Spadns
SS - Scott-Sanchis
MM - Megregian-Maier

Type of Feeder
G-1 Gravimetric - BIF Model 48
G-2 Gravimetric - BIF Model 31-01
G-3 Gravimetric - BIF Model 1
G-4 Gravimetric - BIF Model 31-12
P-1 Diaphram Metering Pump - W & T A-747
P-2 Diaphram Metering Pump - F & P 71R3200
V-1 Volumetric - BIF 25-01, Helix Type
V-2 Volumetric - BIF 23-02, Rotating Disk
V-3 Volumetric - BIF 50, Rotating Disk
V-4 Volumetric - W & T A-378, Roll Type
V-5 Volumetric - W & T A-107, Roll Type
V-6 Volumetric - W & T A-690, Screw Type

Test Equipment
T-1 Color Comparator - Hellige Aqua Tester
T-2 Photometer - Hach DR
T-3 Photometer - Klett-Summerson Model 900-3
T-4 Photometer - Photovolt Model 450
T-5 Photometer - Photovolt Model 401
T-6 Spectrophotometer - B & L Spectronic 20
T-7 Spectrophotometer - B & L Model B

a/ Includes 4-6 MGD Fluoridated Water Purchased From Miami. (Water Pumped At Eastside Plant)
b/ Fluoridation Discontinued 9/19/73 - Operator Reported no H_2SiF_6 Available
c/ Fluoridation Discontinued 5/18/73 - Feeder Repairs Required

supply. Twenty-six communities, estimated population 300,000, were reported using one or more water sources containing natural fluorides of 0.7 mg/l or higher.[2] Therefore, forty-two water systems representing less than three percent of the 1800 public water supplies were supplying dentally significant concentrations of fluorides to 1.8 million people or approximately 1/4 of the State's population. Florida ranks 38th of all States in percentage of population on public water supplies with natural or controlled fluoridation. Thirteen communities were using one or more water sources containing natural fluorides greater than 1.4 mg/l.

The proven benefits in dollars derived from fluoridation to prevent dental caries for the population in Florida presently served by fluoridated water are estimated to be $13.7 million annually.[3] The annual cost to the sixteen communities to fluoridate their water is estimated at $240,000 and the annual cost to the State for implementing a satisfactory fluoridation program is estimated at $34,000 giving a benefit cost ratio to the State of 50 to 1. To receive full value of the benefits of fluoridation, it is essential that the fluoride ion level at the communities presently fluoridated be maintained as close to the optimum value (0.7 mg/l) as possible since a reduction of only 0.2 mg/l below the optimum can reduce the benefits of fluoridation by 50 percent.

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[2] Natural Fluoride Content of Community Water Supplies, 1969, U.S. Department of Health, Education, and Welfare, Public Health Service.
[3] Calculations of the Fluoridation Benefits in Florida are appended.

Evaluation Procedure

To evaluate the adequacy of the Florida water fluoridation control program, the fluoridated public water supply systems in the State were examined with respect to: fluoride ion content in the distribution system; analytical control of the fluoride ion level (records kept); fluoride chemical feed equipment and facilities; fluoride chemical compound storage and handling; operator training and interest; and surveillance. A field inspection survey was conducted at each installation, survey forms were completed,[4] and water samples were collected for fluoride ion analysis.

The actual level of fluoride ion in the distribution system is the single most important factor in evaluating the adequacy of a community water fluoridation effort and hence in evaluating the State program responsible for approval and surveillance of the installation. However, since distribution samples collected on one particular day may not give a true picture of day-to-day operating conditions, the installations were also evaluated with respect to the following:

I. Analytical Control of the Fluoride Ion Level
    A. Were the fluoride ion analyses conducted at the water plant accurate within ± 0.1 mg/l of the value determined by the Environmental Protection Agency?
    B. Were finished water samples analyzed daily or more frequently for fluoride ion content?
    C. Were raw water samples analyzed regularly for fluoride ion content?

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[4] A copy of the questionnaire used in the Florida Fluoridation Study is appended.

D. Were laboratory equipment and facilities at the water plant adequate to conduct fluoride ion analysis according to one of the three standard methods?

E. Was laboratory equipment clean and given responsible care?

F. Were complete records kept of the fluoridation operation?

II. Fluoride Chemical Feed Equipment and Facilities

A. Were the fluoride feed equipment and facilities adequate to control the fluoride ion level in the finished water?

B. Was positive protection provided against overfeeding? Was backflow protection provided? Was equipment location and point of fluoride chemical application at the best practical site? Was the feed equipment site uncluttered?

C. Was the fluoride chemical feed installation operated continuously for the past twelve months without an interruption of more than one day?

D. Were the fluoride chemical feed equipment and facilities maintained satisfactorily?

III. Fluoride Chemical Compound - Storage and Handling

A. Was the fluoride chemical compound stored in a safe, protected and orderly manner?

B. Was safety equipment available and were safe procedures followed in handling the fluoride chemical compound?

C. Were fluoride chemical shipping containers disposed of satisfactorily or re-used only for fluoride chemical storage?

IV. Operator Training and Interest

A. Were plant operating personnel well-trained to operate the fluoride chemical feed equipment and facilities?

B. Were personnel conducting the fluoride ion analyses knowledgeable of their test equipment and standard procedures for analysis?

C. Was the water plant official interviewed in favor of fluoridation and was he interested in adding fluorides to public water supply systems?

V. Surveillance

A. Were check samples for fluoride ion analysis submitted to the state as required?

B. Had the water fluoridation installation surveyed been inspected in the past twelve months by a representative of the state water supply program surveillance agency?

Summary of Findings

Data collected on the water supply systems fluoridating in the State of Florida indicated only six (43 percent) of the fourteen installations rated 5/ evidenced a fluoride ion content in the distribution system at the time of the survey within the 0.6-0.8 mg/l range recommended by the State Division of Health for the communities surveyed. Five of the facilities were underfeeding, i.e. the fluoride ion levels in

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5/ The fluoridation installations at two of the sixteen reported fluoridated supplies (Ocala and Ormond Beach) were not operating at the time of the survey and were not rated.

the samples collected from the distribution systems were less than 0.6 mg/l, and two were overfeeding. Water samples collected from one system (Sanford) were both below and above the recommended fluoride ion level. Table II, Analysis of Samples From Fluoridated Water Supply Systems, tabulates the fluoride ion analysis of the water samples collected at each facility surveyed. 6/

The operating conditions observed during the time of the survey of the fourteen fluoridation installations rated are summarized as follows:

I. Analytical Control of the Fluoride Ion Level

Practices to analytically test and control the fluoride ion level in the distribution systems varied considerably. Only six (43 percent) of the plant operators or laboratory personnel testing water samples for fluoride ion content conducted the analysis within ± 0.1 mg/l of the duplicate sample analysis performed by the Environmental Protection Agency. Daily finished water fluoride ion analysis and regular raw water fluoride ion analysis was being conducted at each of the fourteen installation rated; however, the laboratory personnel at two of the installations (Miami and North Miami) were not using one of the three Standard Methods for analysis. Analytical equipment and facilities were judged adequate at twelve (86 percent) of the facilities. Care of equipment and records of the fluoridation operation were acceptable at all fourteen of the installations rated.

6/ Water samples were analyzed for fluoride ion content by the Water Supply Division, Environmental Protection Agency, Washington, D. C. using the Electrode Method.

FLORIDA WATER SUPPLY PROGRAM EVALUATION
TABLE II
ANALYSIS OF SAMPLES FROM FLUORIDATED WATER SUPPLY SYSTEMS

Water Supply System	Date of Sample (1973)	Fluoride Content, mg/l				
		Raw Water	Check Sample (Operator)	Check Sample (EPA)	Distribution System	
Belle Glade	10/10	0.53	0.95	0.71	0.71	0.63
Clewiston	10/10	0.35	0.68	0.39	0.56	0.53
Coca	10/9	0.21	0.86	0.69	0.69	0.68
Daytona Beach	10/4	0.21	0.58	0.67	0.69 0.67	0.69
Fort Pierce	10/10	0.30	0.73	0.60	0.69	0.68
Gainesville	10/2		0.75	0.79	0.78	0.81
Plant #1		0.33				
Plant #2		0.33				
Leesburg	10/3	0.19	0.75	0.71	0.72	0.74
Melbourne	10/9	0.11				
North Plant			0.64	0.45	0.45	
South Plant			0.68	0.48	0.47	0.48
Miami						
Hileah	10/12, 19, 24	0.24	0.90	0.82	0.85	0.90
Orr	10/12	0.19	0.96	0.94	0.91	
Preston	10/12, 19, 24	0.22	1.06	0.85		
Naples	10/11	0.12	0.75	0.42	0.37	0.45
North Miami	10/12					
Westside Plant		0.20	0.7	0.63	0.63	
Eastside Plant a/					0.18	
Ocala b/	10/3					
Plant #1		0.24	0.1	0.20		
Plant #2		0.20				
Orlando	10/5					
Highland		0.20	0.80	0.82	0.86	
Pine Hills						
Primrose						
Kuhl		0.17			0.82	
Conway		0.18			0.88	
Martin						
Kirkman						
Ormond Beach c/	10/4	0.22	0.4	0.16		
Palatka	10/2		0.55	0.54	0.67	0.47
Well #5		0.27				
6		0.25				
7		0.27				
8						
Sanford	10/5					
Plant #1		0.12	0.87	0.75	0.57	
Plant #2		0.15			1.13	

a/ Not Fluoridated
b/ Fluoridation Discontinued 9/19/73 - Operator Reported no H_2SiF_6 Available
c/ Fluoridation Discontinued 5/18/73 - Feeder Repaires Required

II. Fluoride Chemical Feed Equipment and Facilities

Fluoride chemical feed equipment and facilities to control the distribution system fluoride ion level to within the required range were adequate at the fourteen installations surveyed; however, only nine (64 percent) of the feeding arrangements were acceptable, i.e. protected against overfeeding, protected against backflow, preferred point of chemical application, and good housekeeping in the feeder area. Eight (57 percent) of the operators reported one or more interruptions in fluoridation of one or more days duration in the past twelve months. Three of the installations rated (Belle Glade, Leesburg, and Palatka) are closed down when the class A or B operators at the plants are on leave or out of town in compliance with the policy of the Bureau of Sanitary Engineering requiring all fluoridation installations to be under the responsible charge of a class A or B operator. This policy resulted in two or three weeks per year shut down at the three plants. Maintenance conditions were found satisfactory at eleven (79 percent) of the fourteen facilities surveyed.

III. Fluoride Chemical Compound - Storage and Handling

Storage arrangements for the fluoride chemical compounds fed were satisfactory at the fourteen installations surveyed, but seven (50 percent) of the operators interviewed did not have available suitable safety equipment to handle the fluoride chemical compounds. Disposal of the empty chemical shipping containers was satisfactory at all the sites visited.

IV. Operator Training and Interest

A trained operator with a genuine interest in feeding fluorides is essential to the satisfactory operation of a fluoridation installation. All fourteen of the facilities surveyed were operated by personnel familiar with the fluoride chemical feed equipment at their plants. The operators questioned were also well trained in the use of the fluoride ion test equipment provided and the procedures to follow in conducting fluoride ion analysis; however, the check sample results of eight operators (57 percent) were not within ± 0.1 mg/l of the EPA values. No objection to feeding fluorides was evident among the operators at the sites visited.

V. Surveillance

Frequent check samples of fluoride ion levels in the distribution system and regular inspection visits to the water fluoridation installation by State water supply surveillance personnel must be conducted to assure the facility is operating satisfactorily. The Bureau of Sanitary Engineering requests four to six samples per month to be collected from the distribution system of fluoridated water supplies and submitted to the State Laboratory for fluoride ion analysis. A review of laboratory records revealed the required number of check samples had been submitted by the installations surveyed. The check samples collected at each system, however, are generally taken all on the same day which samples the fluoride ion content in the distribution system for only one day each month. Collecting one sample weekly or every five days for a total of four to six samples each month would be more representative without changing the present laboratory load. Delays up to one year were also noted in returning the laboratory analysis results to the water plant. For maximum benefit, the water plant operator should be advised of the results as soon as the analysis is completed. Only nine (64 percent) of the fourteen plants had been visited in the past twelve months by a representative of the State water supply surveillance agency. Inspection visits to the water supply systems surveyed averaged one visit in ten months.

Figure 2, Operating Conditions at Fluoridated Water Supply Systems in Florida, summarizes the operating conditions observed at the installations inspected during the time of the survey. Conditions varied at each facility, and Table III, Adequacy of the Fluoridation Installations in Florida, summarizes the adequacy of the operating conditions at each facility rated during the time of the survey.

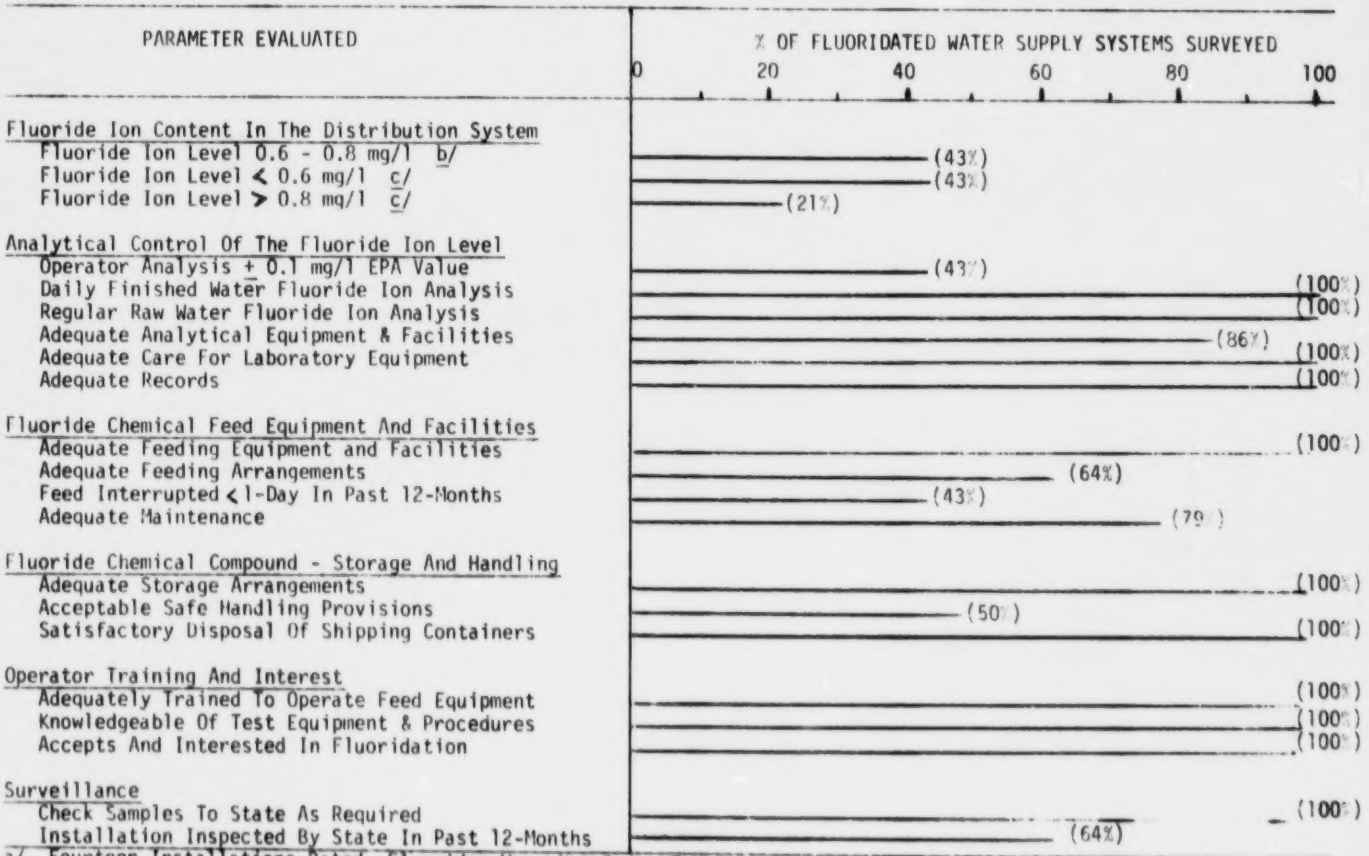
Conclusions and Recommendations

1. Sixteen of the approximately 1800 public water supplies in the State of Florida were reported fluoridating on September 1, 1973, serving an estimated population of 1.5 million. (Two of the supplies were not fluoridated at the time of the survey.) Twenty-six communities, estimated population 300,000, were using one or more water sources containing natural fluorides of 0.7 mg/l or higher. Therefore, only forty-two water systems serving 1.8 million population, less than 3 percent of the public water supply systems in the State, were attempting to fluoridate or supply water containing natural fluorides of 0.7 mg/l or higher.

FLORIDA WATER SUPPLY PROGRAM EVALUATION

FIGURE 2

OPERATING CONDITIONS AT FLUORIDATED WATER SUPPLY SYSTEMS IN FLORIDA a/



a/ Fourteen Installations Rated. Fluorides Were Not Being Fed At Ocala & Ormond Beach When Surveyed

b/ State Recommended Control Limits For Water Supplies Surveyed

c/ Distribution Samples From Sanford Were < 0.6 and > 0.8 mg/l Fluoride

FLORIDA WATER SUPPLY PROGRAM EVALUATION
TABLE III
ADEQUACY OF THE FLUORIDATION INSTALLATION IN FLORIDA

PARAMETER EVALUATED	Belle Glade	Clewiston	Cocoa	Daytona Beach	Fort Pierce	Gainesville	Leesburg	Melbourne	Miami	Naples	North Miami	Ocala a/	Orlando	Ormond Beach b/	Palatka	Sanford
Fluoride Ion Content In The Distribution System																
Fluoride Ion Level 0.6 - 0.8 mg/l c/	0	X	0	0	0	0	0	X	X	X	X		X		X	X
Fluoride Ion Level < 0.6 mg/l d/		X						X		X	X				X	X
Fluoride Ion Level > 0.8 mg/l d/									X				X			X
Analytical Control Of The Fluoride Ion Level																
Operator Analysis ± 0.1 mg/l EPA Value	X	X	X	0	X	0	0	X	X	X	0		0		0	X
Daily Finished Water Fluoride Ion Analysis	0	0	0	0	0	0	0	0	0	0	0		0		0	0
Regular Raw Water Fluoride Ion Analysis	0	0	0	0	0	0	0	0	0	0	0		0		0	0
Adequate Analytical Equipment & Facilities	0	0	0	0	0	0	0	0	X	0	X		0		0	0
Adequate Care For Laboratory Equipment	0	0	0	0	0	0	0	0	0	0	0		0		0	0
Adequate Records	0	0	0	0	0	0	0	0	0	0	0		0		0	0
Fluoride Chemical Feed Equipment And Facilities																
Adequate Feeding Equipment and Facilities	0	0	0	0	0	0	0	0	0	0	0		0		0	0
Adequate Feeding Arrangements	0	0	0	X	0	0	0	X	0	X	0		0		X	X
Feed Interrupted < 1-Day In Past 12-Months	X	X	0	0	X	0	X	0	0	0	X		X		X	X
Adequate Maintenance	X	0	0	X	0	0	0	0	0	0	0		0		X	0
Fluoride Chemical Compound - Storage And Handling																
Adequate Storage Arrangements	0	0	0	0	0	0	0	0	0	0	0		0		0	0
Acceptable Safe Handling Provisions	0	X	0	X	X	X	X	0	0	0	0		0		X	X
Satisfactory Disposal Of Shipping Containers	0	0	N/A	0	0	0	0	0	0	0	0		0		0	0
Operator Training And Interest																
Adequately Trained To Operate Feed Equipment	0	0	0	0	0	0	0	0	0	0	0		0		0	0
Knowledgeable Of Test Equipment & Procedures	0	0	0	0	0	0	0	0	0	0	0		0		0	0
Accepts And Interested In Fluoridation	0	0	0	0	0	0	0	0	0	0	0		0		0	0
Surveillance																
Check Samples To State As Required	0	0	0	0	0	0	0	0	0	0	0		0		0	0
Installation Inspected By State In Past 12-Months	0	0	0	0	0	X	X	0	0	0	0		X		X	X

0 - Satisfactory; X - Unsatisfactory; N/A - Not Applicable

a/ Fluoridation Discontinued 9/19/73 - Operator Reported No H_2SiF_6 Available

b/ Fluoridation Discontinued 5/18/73 - Feeder Rapairs Required

c/ State Recommended Control Limits For Water Supplies Surveyed.

d/ Distribution Samples From Sanford Were < 0.6 mg/l and > 0.8 mg/l Fluoride

Recommendation

The Florida Department of Health and Rehabilitative Services should more actively promote fluoridation in Florida. A concentrated effort should be made to provide the benefits of fluoridated water to the population served by public water supplies which are not fluoridated or do not contain dentally significant concentrations of natural fluorides. Where no community water supply system exists, school water supply fluoridation in that community should be considered.

2. Thirteen public water supplies in Florida were reported using one or more water sources containing natural fluorides greater than 1.4 mg/l.

Recommendation

When the natural fluoride ion content in a public water supply exceeds two times the optimum, the following should be considered so the finished water will have a fluoride ion content within the limits recommended by the State: blending of water containing high levels of fluoride ion with a low natural fluoride water, development of an alternate source of water, or defluoridation of the water source.

3. Only six (43 percent) of the fourteen fluoridated water supply systems rated evidenced a fluoride ion content in the distribution system within the 0.6-0.8 mg/l limits recommended by the State Board of Health for the supplies surveyed. Six (43 percent) of the plant operators or laboratory personnel testing water samples for

fluoride ion content conducted the analysis within ± 0.1 mg/l of the duplicate sample analysis performed by the Environmental Protection Agency. Two of the water plant laboratories were not using standard methods for fluoride ion analysis. Frequency of sampling and record keeping were acceptable at each installation rated.

Recommendation

The Florida Department of Health and Rehabilitative Services should require the operators at all fluoridation installations to conduct fluoride ion analysis according to Standard Methods to within ± 0.1 mg/l of the value reported on the State check sample.

4. Fluoride chemical feed equipment and facilities were satisfactory at fourteen of the installations rated, however, feeding arrangements were judged inadequate at five (36 percent) of the water plants. Eight (57 percent) of the installations had one or more interruptions in the fluoridation operation of one or more days duration in the past twelve months and maintenance was less than satisfactory at three (21 percent) of the facilities visited.

Recommendation

The Florida Department of Health and Rehabilitative Services should develop criteria for installing fluoridation equipment, thoroughly review all proposed installations before the operation is approved, and assist the operator as needed during the "start-up" period. All interruptions in the fluoridation operations should be required to be reported to the Bureau of Sanitary Engineering. Provisions should be made for the uninterrupted, operation of all fluoridation installations year around. A preventive maintenance program should be established for each facility and closely followed for the installation to receive continued approval for operation.

5. Fluoride chemical storage arrangements and disposal of empty chemical shipping containers were judged satisfactory at the installations surveyed, however, seven (50 percent) of the operators did not have available suitable safety equipment to handle the fluoride chemical compounds used.

   Recommendation

   The Florida Department of Health and Rehabilitative Services should provide to all water plant operators feeding fluorides training on safe handling practices for fluoride chemical compounds and should promulgate regulations for storage and handling fluoride chemical compounds used in water fluoridation in the State.

6. A trained operator with a genuine interest in feeding fluorides is essential to the satisfactory operation of a fluoridation installation. The training and interest of the principal operators of the fourteen facilities rated was satisfactory, however, three of the installations were not permitted to operate during periods when the principal operators were on vacation or out of town.

Recommendation

The Florida Department of Health and Rehabilitative Services should provide training in fluoride feed equipment operation and maintenance and fluoride determinations in water for all the operators of fluoridated water supply systems in the State. The importance of maintaining an optimum level of fluoride ion in the distribution system at all times should be stressed. Satisfactory completion of the training should be a mandatory requirement of each plant operator for approval of his installation to feed fluorides.

7. Surveillance of each water fluoridation installation must be on a regular, continual basis to assure the facility is operating satisfactorily. While the operators of all fourteen of the installations rated were submitting the required number of check samples to the State laboratory for fluoride ion analysis, results of the fluoride ion analysis were delayed in reaching the operators. Five (36 percent) of the installations had not been visited by a representative of the State water supply surveillance agency or local health department in the past twelve months.

Recommendation

The four to six check samples sent to the State each month should preferably be collected one each week or one every five days. The State laboratory fluoride ion analysis check sample results should be returned to the plant operator for control purposes as soon as possible. Interruptions in the fluoridation feed operations at any plant or any variation in check sample results greater than ± 0.1 mg/l should be investigated. All plants employing new operating personnel placed in charge of the fluoridation operation should be visited immediately to assure the new operator has been adequately trained. Inspection visits to each fluoridation installation in the State should be scheduled once each year.

8. The proven benefits in dollars derived from fluoridation to prevent dental caries for the population in Florida presently served by fluoridated water are estimated to be $13.7 million annually. The annual cost to the sixteen communities to fluoridate their water is estimated at $240,000 and the annual cost to the State for implementing a satisfactory fluoridation program is estimated at $34,000 giving a benefit cost ratio to the State of 50 to 1.

Recommendation

The Florida Department of Health and Rehabilitative Services should supplement their existing fluoridation program effort by the assignment to this activity of an additional six man-months per year of engineering services with the necessary travel funds and laboratory support.

APPENDIX

A. Fluoridation Benefits in Florida - Calculations

B. Questionnaire used in the Florida Fluoridation Survey

Appendix A

FLUORIDATION BENEFITS IN FLORIDA - CALCULATIONS

Population Served by Fluoridated Water - 1,500,000
(Data received from the sixteen fluoridated
water supplies in the State)

Average Annual Cost to Communities Fluoridating - $0.16/capita/yr.
("Fluoridation of Public Water Supplies" -
New York State Department of Health)

Total Annual Cost of Fluoridation in Florida to Communities Fluoridating:

1,500,000 X $0.16 = $240,000

Average Annual Benefit of Fluoridation to Communities Fluoridating -
$57/yr/dollar spent on fluoridation.
("The Economics of Fluoridation" - DDH, PPB #31, USPHS)

$240,000 X $57 = $13,700,000

Total Annual Cost to the State for Fluoridation Surveillance:

1 man year + travel @ $30,000 =	$30,000
Laboratory Support 16 installations, six samples/month/installation, $3.00/sample	
16 X 6 X 12 X $3.50 -	$ 4,030
Total	$34,030 or $34,000

Benefit Cost Ratio:

$$\frac{\text{Annual Benefit of Fluoridation}}{\text{Annual Cost to Communities + Annual Cost to State}} = \frac{\$13.7\text{X}10^{6}}{\$240{,}000 + \$34{,}000} \text{ or } 50:1$$

DATE: ________________

Appendix B

FLORIDA FLUORIDATION SURVEY

Water System:

Population Served: Average Flow:

Date Fluoridation Started:

Source of Supply:

Treatment:

Fluoride Analysis:
Raw Water: Finished Water:

Fluoridation Equipment -

Manufacturer:

Type:

Model:

Location:

Point of Application:

Condition of Equipment:

Operational Problems:

Overfeeding Safeguards:

Planned Improvements:

Remarks:

Fluoride Compound -

Chemical: Cost:

Source:

Form of Shipment

Storage Facilities:

Quantity Used:

Safety Provisions:

Disposal of Containers:

Remarks:

Control of Fluoridation -

Frequency of Sampling:
Raw Water: Finished Water:

Sampling Point:

Test Method:

Test Instrument:
Adequacy

Condition

Records:
Calculated

Lab

Interruptions:

Remarks:

Operator Qualifications -

Experience: Classification:

Training:

Interest:

Remarks:

Surveillance -

Check Samples:

Last Visit by State:

Availability of Technical Assistance:

Remarks:

Comments -

APPENDIX D

FLORIDA STATUTES

1971

Volume 2

TITLE XXVII

PUBLIC HEALTH

CHAPTER 381

PUBLIC HEALTH; GENERAL PROVISIONS

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381.011 Advisory council, appointment, etc.—The advisory council to the division of health of the department of health and rehabilitative services, referred to in this chapter as the council, shall be composed of six members appointed by the governor: one of whom shall be an osteopathic physician, licensed to practice under chapter 459; two of whom shall be doctors of medicine, licensed to practice under chapter 458; one of whom shall be a dentist licensed to practice in Florida; one of whom shall be a pharmacist licensed to practice in Florida; and one shall be a discreet citizen of Florida (or a licensed practitioner, other than a doctor of medicine of one of the healing arts for the treatment of human ills). Each member before assuming his official duties shall take an official oath. Term of office shall be four years from date of appointment or until a successor is appointed and qualified, except unexpired terms, in which case the appointment shall be to the end of the unexpired term only. The council at each annual meeting shall elect its president who shall call and preside at all meetings.

History.—[illegible]
Note.—See former §§381.01, 381.02, 381.04

381.021 Division headquarters.—The headquarters of the division of health shall be in Jacksonville.

History.—§2, ch. 29834, 1955; §§19, 35, ch. 69-106.
Note.—See former §381.03

381.031 Duties and powers of the division.—

(1) It shall be the duty of the division of health to:

(a) Formulate general policies affecting the public health of the state;

(b) Supervise generally the enforcement of laws, rules and regulations relating to sanitation, control of communicable diseases among humans and from animals to humans, quarantine and the general health of the state;

(c) Cooperate with and accept assistance from the surgeon general of the United States public health service and other appropriate federal officials in the enforcement of quarantine regulations, and in the prevention and suppression of communicable diseases;

(d) Declare, enforce, modify, and abolish quarantine as the circumstances indicate;

(e) Provide for a thorough investigation and study of the frequency of occurrence, causes and modes of propagation and means of prevention, control and cure of diseases among humans, and from animals to humans, especially communicable diseases, epidemic and otherwise;

(f) Provide for the dissemination of information to the public relative to the prevention and control of communicable diseases among humans and from animals to humans and the promotion and protection of the physical and mental health of the people of the state by means of printed matter, radio, lectures, exhibits and other media;

(g) Adopt, promulgate, repeal and amend rules and regulations consistent with law regulating:

1. Control of communicable diseases;

2. Prevention and control of public health nuisances;

3. Sanitary practices relating to drinking water made accessible to the public; watersheds used for public water supplies; disposal of excreta, sewage or other wastes; the disposal of garbage and refuse; plumbing; rodent control; drainage and filling in connection with the control of arthropods of public health importance; production, handling, processing, and sale of food products and drinks including milk, dairies and milk plants; canning plants, shellfish dealing and handling establishments, restaurants and all other places serving food and drink to the public; toilets and washrooms in all public places and places of employment; factories; trailer, tourist, recreation and other camps offering accommodations to the public; swimming pools and bathing places; state, county, municipal and private institutions serving the public; jointly with the state board of education, public and privately owned schools; vehicles offering transportation to the public; all places used for the incarceration of prisoners and inmates of state institutions for the mentally ill; and any other condition, place or establishment necessary for the control of communicable diseases or the protection and safety (light and ventilation) of the public health.

4. Control of arthropods of public health importance.

5. Qualifications of operators of milk plants, water purification plants, sewage treatment plants and swimming pools;

6. Segregation, quarantine and control of all animals and birds having, or suspected of having, diseases communicable to man;

7. Nursing homes;

8. Practice of midwifery;

9. Bedding inspection;

10. Disposal of dead bodies;

11. Execution of any other purpose or intent of the laws enacted for the protection of the public health of Florida.

Regulations adopted under subparagraphs 2., 3., 4., 5., and 10., of this paragraph shall be called and known as the sanitary code of Florida.

(2) The division may maintain a mental health bureau which shall advise and assist local departments of health and education in the establishment of mental health services, particularly in connection with maternal and child health conferences and in the schools of the state, and may conduct such other activities as may be required in the development of mental health services as related to the public health.

(3) The division may issue, adopt, amend and repeal separate orders and rules consistent with law to meet any emergency not provided by the general rules and regulations for the purpose of suppressing nuisances dangerous to public health, communicable diseases and other dangers to the public and private health of the state.

(4) The division may commence and maintain all proper and necessary actions and proceedings for any or all of the following purposes:

(a) To enforce its rules and regulations.

(b) 1. To make application for injunction to the proper circuit court and the judge of said court shall have jurisdiction upon hearing and for cause shown to grant a temporary or permanent injunction or both restraining any person from violating or continuing to violate any of the provisions of this chapter or from failing or refusing to comply with the requirements of this chapter, such injunction to issue without bond; provided, however, no temporary injunction without bond shall be issued except after a hearing of which the

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respondent or respondents has or have been given not less than seven days prior notice, and no temporary injunction without bond, which shall limit or prevent operations of an industrial, manufacturing or processing plant shall be issued, unless at the hearing, it shall be made to appear by clear, certain and convincing evidence that irreparable injury will result to the public from the failure to issue the same.

2. In event of the issue of a temporary injunction or restraining order hereunder without bond, then this state, in event said injunction or restraining order was improperly, erroneously or improvidently granted, shall be liable in damages and to the same extent as if said injunction or restraining order had been issued upon application of a private litigant instead of a public litigant, and the state hereby waives its sovereign immunity and consents to be sued in any such case.

3. In addition to the authority granted by this law, the division may commence and maintain all proper and necessary actions and proceedings to enjoin and abate nuisances dangerous to the health of persons, fish and livestock

(c) To compel the performance of any act specifically required of any person, officer or board by any law of this state relating to public health.

(d) To protect and preserve the public health.

(e) It may defend all actions and proceedings involving its powers and duties.

History.—§2, ch. 26834, 1965; §§1-3, ch. 57-787; §1, ch. 67-436; §§19, 35, ch. 69-106; §141, ch. 71-377.

Note.—See former §§381.15-381.17, 381.35, 381.36, 381.44, 381.49-381.52, 381.55.

381.061 Duties of division of health.—It shall be the duty of the division of health to:

(1) Act as state registrar of vital statistics;

(2) Administer and enforce laws, enforce rules and regulations relating to sanitation, control of communicable diseases in humans and from animals to humans, and the general health of the people of Florida;

(3) Supervise and cooperate with municipal and county officials and employees in enforcing the state health laws, rules and regulations promulgated by the division and consistent with local health regulations and ordinances;

(4) Cooperate with and assist federal health officers in the enforcement of public health laws and regulations;

(5) Declare, enforce, modify and abolish quarantine as the circumstances may indicate;

(6) Cooperate with other appropriate state, county, municipal, and private boards, departments or organizations for the improvement and preservation of the public health;

(7) Prepare annually for presentation to the department of administration a budget of expenditures anticipated to be made by the division during the succeeding year.

(8) Prepare sanitary and public health rules and regulations and legislation.

(9) Observe diligently the sanitary and public health conditions throughout the state and take necessary precautions to protect it in its sanitary and public health relations with other states and countries.

(10) Perform any other duties prescribed by the law.

History.—§2, ch. 26834, 1951; §§2, 3, ch. 67-471; §142, ch. 71-377.

Note.—See former §§381.05, 381.17, 381.18.

381.062 Eminent domain.—Whenever the division of health of the department of health and rehabilitative services shall find it necessary to acquire private property for the use of said division and to be occupied by said division, the said division is empowered to exercise the power of eminent domain and to proceed to condemn said property in the manner provided by chapter 73.

History.—§1, ch. 57-232; §§19, 35, ch. 69-106.

381.071 Regulations and ordinances superseded.—The provisions of the rules and regulations adopted and promulgated by the division of health under the provisions of this chapter shall, as to matters of public health, supersede all regulations enacted by other state departments, boards or commissions, or ordinances and regulations enacted by municipalities; provided, no provision of this chapter shall be construed as altering or superseding any of the provisions set forth in chapters 502 and 503, or any rule or regulation adopted under the authority of said chapters.

History.—§2, ch. 26834, 1955, §§19, 35, ch. 69-106.
Note.—See former §381.53.

381.081 Presumptions.—The authority, action and proceedings of the division of health in enforcing the rules and regulations adopted by it under the provisions of this chapter shall be regarded as judicial in nature and treated as prima facie just and legal.

History.—§2, ch. 26834, 1955, §§19, 35, ch. 69-106.
Note.—See former §381.54.

381.091 Construction, rules and regulations.—Nothing contained in the rules and regulations adopted by the division under the provisions of this chapter shall be construed as limiting any duty or power of the division provided by the statute laws of Florida.

History.—§2, ch. 26834, 1955, §§19, 35, ch. 69-106.
Note.—See former §381.57.

381.101 Municipal regulations and ordinances.—Any municipality may enact, in manner prescribed by law, health regulations and ordinances not inconsistent with state public health laws and rules and regulations adopted by the division of health.

History.—§2, ch. 26834, 1955; §§19, 35, ch. 69-106.
Note.—See former §§381.53, 381.56.

381.111 Power to enforce.—The division of health or any officer or agent of the division

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designated for the purpose may enforce any of the provisions of this chapter or any rule and regulation promulgated by the division under the provisions of this chapter and if necessary may appear before any magistrate empowered to issue warrants in criminal cases and request the issuance of a warrant. Said magistrate shall issue a warrant directed to any sheriff, deputy, constable or police officer to assist in any way to carry out the purpose and intent of this chapter.

History.—§2, ch. 29834, 1955; §§19, 35, ch. 69-106.
Note.—See former §381.19.

381.121 Enforcement; city and county officers to assist.—It shall be the duty of every state and county attorney, sheriff, constable, police officer and other appropriate city and county officials upon request to assist the division of health or any of its agents in the enforcement of the state health laws and the rules and regulations promulgated under the provisions of this chapter.

History.—§2, ch. 29834, 1955; §§19, 35, ch. 69-106.
Note.—See former §381.17.

381.131 Council meetings.—Meetings of the council shall be held each year on the second Tuesday of February and other meetings may be called by the president of the council or the governor.

History.—§2, ch. 29834, 1955; §§19, 35, ch. 69-106.
Note.—See former §§381.06-381.08.

381.141 Compensation, council members.—When attending official meetings council members shall receive twenty-five dollars per day and traveling expenses as provided by law.

History.—§2, ch. 29834, 1955; §§19, 35, ch. 69-106.
Note.—See former §381.09.
cf.—§112.061 Travel expenses of state officials and employees.

381.151 Per diem; traveling expenses; agents and other employees.—Agents and employees of the division when traveling on state business shall be allowed per diem and traveling expenses as provided by law.

History.—§2, ch. 29834, 1955; §§19, 35, ch. 69-106.
Note.—See former §§381.09, 381.62.
cf.—§112.061 Travel expenses of state officials and employees.

381.171 Purchase, lease and sale of real property.—

(1) The division may purchase, lease or otherwise acquire land and buildings and take a deed thereto in the name of the state, for the use and benefit of the division, subject to available appropriations therefor, when the acquisition is necessary to the efficient accomplishment of the purposes of this chapter.

(2) The division may sell, lease or convey in the name of the state for the use and benefit of the division, any land and buildings owned by the state for the use and benefit of the division which lands and buildings are no longer necessary for carrying out the purposes of this chapter.

(3) Title is confirmed in the division to any real estate which has heretofore been conveyed or attempted to be conveyed to the division.

History.—§2, ch. 29834, 1955; §§19, 35, ch. 69-106.
Note.—See former §381.71.
cf.—§253.03(6) title to state owned lands.

381.181 Expenditures.—All expenditures shall be certified by the division of health and disbursement made by the state comptroller by warrant on the state treasurer except as otherwise provided in this chapter.

History.—§2, ch. 29834, 1955; §§19, 35, ch. 69-106.
Note.—See former §§381.11, 381.13.

381.201 Application for and acceptance of gifts or grants.—The division of health may apply for and accept any funds, grants, gifts or services made available to it by any agency or department of the federal government or any other agency or private individual in aid of any present or future health program undertaken, maintained or proposed. All moneys received under the provision of this section shall be deposited in the state treasury and shall be disbursed in the same manner as other funds of the division.

History.—§2, ch. 29834, 1955; §§19, 35, ch. 69-106.
Note.—See former §381.161.

381.211 Disposition of equipment and material; transfers to county health departments.—

(1) The division of health may exchange, sell or otherwise dispose of any obsolete, worn-out or unsuitable material or equipment which it owns when it deems such disposition to be to the financial benefit of the state. The proceeds from such disposition shall be submitted for deposit in the state treasury accompanied by an itemized report of disposition made.

(2) When the division purchases equipment and materials in furtherance of its public health programs from state or federal or state and federal funds for primary use and location in a county health department of this state, it is authorized to transfer title to such equipment and materials to the board of county commissioners of the county where said county health department is located. All property so transferred shall be accounted for as provided in chapter 274.

History.—§2, ch. 29834, 1955; §2, ch. 61-46; §§19, 35, ch. 69-106.
Note.—See former §381.42.
cf.—§18.101 Deposit of public money by boards not located in Tallahassee.
§116.01 Payment of public funds into treasury.

381.221 Annual report.—The division of health shall file with the governor an annual report of the activities and expenditures of the division and recommendations for improving the sanitation of the state and the health of its people, and this annual report shall be published like reports of state officers.

History.—§2, ch. 29834, 1955; §§19, 35, ch. 69-106.
Note.—See former §381.11.

381.231 Report of communicable diseases to division.—

(1) Any attending practitioner, licensed in Florida to practice medicine, osteopathic medicine, chiropractic, naturopathy or veterinary medicine, who diagnoses or suspects the existence of a disease communicable among humans or from animals to humans shall immediately report the fact to the division of health.

(2) Periodically the division shall issue a list of diseases determined by it to be communicable

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within the meaning of this chapter and shall furnish a copy of said list to the practitioners listed in subsection (1).

(3) Reports required by this section shall be made on forms furnished by the division.

(4) Information submitted in reports required by this section is confidential and shall be made public only when necessary to public health. No report so submitted shall be considered a violation of the confidential relationship between practitioner and patient.

History.—§2, ch. 29834, 1955; §§19, 35, ch. 69-106.
Note.—See former §381.301.

381.241 Quarantine regulations; commerce or travel.—No health regulation which restricts travel or trade within the state shall be promulgated or enforced in this state except by authority of the division of health.

History.—§2, ch. 29834, 1955; §§19, 35, ch. 69-106.
Note.—See former §381.31.

381.261 Supervision; water supply and sewage disposal.—The division of health and its agents shall have general supervision and control over all systems of water supply, sewerage, refuse and sewage treatment in the state insofar as their adequacy, sanitary and physical conditions affect the public health.

History.—§2, ch. 29834, 1955; §§19, 35, ch. 69-106.
Note.—See former §381.43.

381.271 Approval of water.—No county, municipality, person, persons, firm, corporation, company, public or private institution or community of more than twenty-five inhabitants shall install a system of water supply, sewerage, refuse or sewage disposal, or materially alter or extend any existing system until complete plans and specifications for the installation, alterations or extensions, together with such other information as the division of health may require have been submitted and approved by the division of health. The division of health may further make and enforce such specific rules and regulations regarding the submission of plans for approval and record as it deems reasonable and proper to carry out the provisions of this section.

History.—§2, ch. 29834, 1955; §§19, 35, ch. 69-106.
Note.—See former §381.44.

381.281 Water supply and disposal system; advisory duty.—The division of health shall consult with and advise any county or municipal authority or any other person as to the source of water supply, methods of water purification, and disposal of drainage, sewage or refuse. It shall also advise and consult with any manufacturer or other person conducting a business or intending to conduct a business whose sewage, waste or waste products may tend to pollute the waters of this state. The division may conduct experiments relating to purification of water and treatment of sewage, waste or refuse.

History.—§2, ch. 29834, 1955; §§19, 35, ch. 69-106.
Note.—See former §381.45.

381.291 Corrective orders; water and disposal systems.—When the division of health or its agents, through investigation, find that any system of water supply, sewerage, refuse or sewage disposal constitutes a nuisance or menace to the public health, it may issue an order requiring the owner to correct the improper condition.

History.—§2, ch. 29834, 1955; §§19, 35, ch. 69-106.
Note.—See former §381.46.

***381.293 Regulation of operators of water purification and waste-water treatment plants.**—

(1) As used in this section:

(a) "Division" means the division of health of the department of health and rehabilitative services.

(b) "Secretary" means the secretary of the department of health and rehabilitative services.

(c) "Operator" means any person, including the owner, who is in actual charge of the operation, supervision, or maintenance of a water purification plant or a waste-water treatment plant, and shall include the person in charge of a shift or period of operation during any part of a day. Operator trainees may be employed as trainees for no more than two years cumulatively.

(2) The division of health of the department of health and rehabilitative services is authorized to examine and certificate all water and waste-water treatment plant operators; to issue, deny, revoke and suspend annual operator certificates pursuant to its rules and regulations and chapter 120; and to charge a fee not in excess of $10 for examination, issuance, and renewal of certification.

(3) No person shall perform the duties of operator of a water or waste-water treatment plant unless he holds a current operator's certificate issued by the division. However, this section shall not apply to licensed public lodging establishments as defined in chapter 509.

(4) All funds collected pursuant to this section shall be deposited in the general revenue fund of the state.

(5) The secretary may promulgate rules, regulations, and minimum standards to effectuate the provisions of this section and insure efficient, hygienic water purification and waste-water treatment operations in this state.

History.—§§1-5, ch. 71-315.
*Note.—Effective July 1, 1972.

381.311 Regulations for municipal and county sanitation.—The division of health shall supervise and regulate municipal and county sanitation and shall exercise general supervision over the work of local health authorities. Local health officials and other appropriate local officials concurrently with the division of health shall enforce the provisions of the state sanitary code and other public health rules and regulations and of such local ordinances and sanitary regulations as may be consistent with it.

History.—§2, ch. 29834, 1955; §§19, 35, ch. 69-106.
Note.—See former §381.56.

381.321 Laboratories.—The division of health may establish and maintain in suitable and convenient places in the state laboratories for microbiological and chemical analyses and any other purposes it determines necessary for the protection of the public health.

History.—§2, ch. 29834, 1955; §§19, 35, ch. 69-106.

381.331 Analyses; human, animal bodies.—The division of health shall have an analysis made of any part of the contents of the human body submitted by any Florida physician, state attorney, solicitor of criminal court or sheriff; or of any part of the contents of the body of any animal submitted by any agent of the state livestock board, any licensed Florida veterinarian or sheriff to determine whether they may contain any foreign matter or poisonous drugs and shall furnish a certificate as to the results of the analysis to the person requesting the analysis.

History.—§2, ch. 29834, 1955; §§19, 35, ch. 69-106
Note.—See former §§381.60, 381.61

381.341 Insulin; purchase, distribution.—The division of health shall purchase and distribute insulin through its agents or other appropriate agent of the state or federal government in any county or municipality in the state to any bona fide resident of Florida suffering from diabetes or kindred disease requiring insulin in its treatment who makes application for and furnishes proof of his financial inability to purchase in accordance with the rules and regulations promulgated by the division concerning the distribution of insulin.

History.—§2, ch. 29834, 1955; §§19, 35, ch. 69-106.
Note.—See former §§381.63, 381.64.

381.351 Division of health to assume control in certain cases.—Whenever the division of health investigates any suspicious case or cases of disease and determines the disease is contagious or infectious and a menace to public health, it shall assume charge and management, and all necessary and legitimate expenses attendant upon the case or cases of disease after charge and management has been assumed by the division of health may be paid out of funds appropriated to the division under provisions of the general appropriations act on vouchers approved as provided by this chapter.

History.—§2, ch. 29834, 1955; §§19, 35, ch. 69-106
Note.—See former §381.29

381.361 Clinics; treatment of cancer.—The division of health shall formulate a plan for the care and treatment of persons suffering from cancer and establish and designate standard requirements for the organization, equipment and conduct of cancer units or departments in hospitals and clinics in Florida. The designations of cancer units shall follow a survey of the needs and facilities for treatment of cancer in the various localities throughout the state.

History.—§2, ch. 29834, 1955; §§19, 35, ch. 69-106.
Note.—See former §381.68

381.371 Cancer, educational program.—The division of health shall formulate and put into effect a continuing educational program for the prevention of cancer and its early diagnosis, and disseminate information concerning its proper treatment to hospitals, cancer patients and the public.

History.—§2, ch. 29834, 1955; §§19, 35, ch. 69-106
Note.—See former §381.69.

381.381 Cancer patients; financial aid.—The division of health shall make rules and regulations specifying to what extent and on what terms and conditions cancer patients of the state may receive financial aid for the diagnosis and treatment of cancer in any hospital or clinic selected. The division may furnish financial aid to citizens of Florida afflicted with cancer to the extent of the appropriation provided for that purpose in a manner which in its opinion will afford the greatest benefit to those afflicted and make arrangements with hospitals, laboratories or clinics to afford proper care and treatment for cancer patients in Florida.

History.—§2, ch. 29834, 1955; §§19, 35, ch. 69-106
Note.—See former §381.70

381.401 Certain practitioners required to register with division; procedure; disposition of fees.—

(1) Every person licensed to practice medicine pursuant to chapter 458, osteopathic medicine pursuant to chapter 459, chiropractic pursuant to chapter 460, podiatry pursuant to chapter 461, naturopathy pursuant to chapter 462, and physical therapy pursuant to chapter 486, shall, on or before January 1 of each year, apply to the division of health for a certificate of registration upon a form furnished by said division, and shall pay at such time a fee of one dollar. Such fee shall be deposited in the general revenue fund. The first application of registration under this law shall be within sixty days after the issuance of the license, and shall be in writing and under oath that the information therein is true and correct. The applicant shall furnish the said division, on a form to be furnished by the division, his full name, post office and resident address, the date and number of his license, college or school from which he graduated, and the date of such graduation and such application shall be duly executed and verified, before an officer authorized to take acknowledgments, and filed with the said division. Registration subsequent to the first registration need not be upon sworn application. The division of health, on or before October 1 of each year after the first registration, shall mail or cause to be mailed to each licensed practitioner, a blank form of application for registration, addressed to the last known post office address of such practitioner. The form of such application shall be the same for all practitioners and shall require the same information from each practitioner thereof. The division of health shall issue upon application therefor, a certificate of registration under the seal of the state for the year ensuing and ending December 31. Each licensed practitioner shall conspicuously display his proper registra-

tion certificate in his office at all times. The division shall supply each county health department with the names of persons registered for the ensuing year whose post office and/or resident address is in their county.

(2) Any person or persons violating the provisions of this section shall be guilty of a misdemeanor of the second degree, punishable as provided in §775.082 or §775.083.

History.—§§1-3, ch. 29852, 1955; §1, ch. 61-123; §2, ch. 65-170; §§19, 35, ch. 69-106; [illegible]

381.411 Penalties.—

(1) Any person who violates any of the provisions of this chapter, any quarantine or any rule or regulation promulgated by the division of health under the provisions of this chapter is guilty of a misdemeanor of the second degree, punishable as provided in §775.082 or §775.083.

(2) Any person who interferes with, hinders or opposes any agent or officer of the division in the discharge of his duties is guilty of a misdemeanor of the second degree, punishable as provided in §775.082 or §775.083.

(3) Any person who maliciously disseminates any false rumor or report concerning the existence of any infectious or contagious disease is guilty of a misdemeanor of the second degree, punishable as provided in §775.082 or §775.083.

(4) Any person who makes fraudulent application for and obtains insulin under the provisions of this chapter is guilty of a misdemeanor of the second degree, punishable as provided in §775.082 or §775.083

History.—§2, ch. 29834, 1955; §§19, 35, ch. 69-106; [illegible]

Note.—See former §§381.18, 381.20, 381.21, 381.47, 381.53, 381.50, 381.64.

381.422 Definitions; migrant labor camps.—As used in §§381.432-381.482 the following words and phrases shall mean:

(1) "Migrant labor camp."—One or more buildings or structures, tents, trailers, or vehicles, together with the land appertaining thereto, established, operated or used as living quarters for fifteen or more seasonal, temporary or migrant workers whether or not rent is paid or reserved in connection with the use or occupancy of such premises, provided however, this definition shall not apply to forestry or tobacco farm operation.

(2) "Division."—The division of health of the department of health and rehabilitative services.

History.—§1, ch. 59-476; §§19, 35, ch. 69-106; §14, ch. 71-[illegible]

381.432 License required for establishment, maintenance or operation of migrant labor camp.—No person shall establish, maintain or operate any migrant labor camp in this state without first obtaining a license therefor from the division and unless such license is posted and kept posted in the camp to which it applies at all times during maintenance or operation of the camp.

History.—§2, ch. 59-476; §§19, 35, ch. 69-106

381.442 Application for license.—Application for a license to establish, operate or maintain a migrant labor camp shall be made to the division in writing and on a form and under regulations prescribed by the division. The application shall state the location of the existing or proposed migrant labor camp, the approximate number of persons to be accommodated, the probable duration of use and any other information the division may require.

History.—§3, ch. 59-476; §§19, 35, ch. 69-106

381.452 Issuance of license.—If the division is satisfied, after causing an inspection to be made, that the camp meets the minimum standards of construction, sanitation, equipment and operation required by regulations issued under §381.472, it shall issue in the name of the division the necessary license in writing on a form to be prescribed by the division. The license, unless sooner revoked, shall expire on June 30 next after the date of issuance unless renewed, and it shall not be transferable. All applications for renewal shall be filed with the division thirty days prior to its expiration on form blanks furnished by the division.

History.—§4, ch. 59-476; §§19, 35, ch. 69-106.

381.462 Revocation of license.—The division may revoke a license authorizing the operation of a migrant labor camp if it finds the holder has failed to comply with any provision of this law or of any regulation or order issued hereunder.

History.—§5, ch. 59-476; §§19, 35, ch. 69-106

381.472 Authority to issue regulations.—The division shall make, promulgate and repeal such rules and regulations as it may determine to be necessary to protect the health and safety of persons living in migrant labor camps, prescribing standards for living quarters at such camps, including provisions relating to construction of camps, sanitary conditions, light, air, safety, protection from fire hazards, equipment, maintenance and operation of the camp and such other matters as it may determine to be appropriate or necessary for the protection of the life and health of occupants. Regulations adopted hereunder shall be a part of the sanitary code of Florida created by §381.031(1) (g) 11. and may be enforced in the manner provided in §381.031(4), and violations thereof shall be subject to the penalties provided in §381.411.

History.—§6, ch. 59-476; §§19, 35, ch. 69-106.

381.482 Right of entry.—The division and/or its inspectors may enter and inspect migrant labor camps at reasonable hours and investigate such facts, conditions, and practices or matters, as may be necessary or appropriate to determine whether any person has violated any provisions of this law or rules and regulations of the division pertaining hereto are being violated. The division may from time to time at its discretion publish the reports of such inspections in its monthly bulletin.

History.—§7, ch. 59-476; §§19, 35, ch. 69-106

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381.492 Survey of state hospital facilities; department of health and rehabilitative services.—

(1) The bureau of community medical facilities planning of the division of planning and evaluation of the department of health and rehabilitative services is hereby designated as the sole agency of the state to carry out the purposes of and administer the federal hospital and medical facilities amendments of 1964.

(2)(a) The governor is authorized to appoint a state advisory council for community medical facilities planning which shall consist of twelve members who are residents of Florida and the chief of the bureau of community medical facilities planning, who shall serve as an ex officio member. Such council shall be assigned to the bureau of community medical facilities planning of the division of planning and evaluation, and shall include representatives of nongovernmental organizations or groups and public agencies concerned with the operation, construction, or utilization of hospital or other facilities for diagnosis, prevention, or treatment of illness or disease or for provision of rehabilitative services, or particularly concerned with education or training of health professions personnel, and an equal number of representatives of consumers, familiar with the need for the services provided by such facilities. The council shall consult with the division of planning and evaluation in carrying out the purposes of the federal hospital and medical facilities amendments of 1964. If the council does not include any representatives of nongovernmental organizations or groups or state agencies concerned with rehabilitation, provision shall be made for consultation with organizations, groups, and state agencies so concerned. The membership shall include at least one representative of the Florida hospital association. The terms of existing members shall not be disturbed by the provisions of chapter 71-213, Laws of Florida.

(b) The members of the advisory council shall be appointed for a term of four years or until their successors are appointed and qualified except that the five additional members authorized by this act shall be appointed for terms as follows: Two for one year, one for two years, one for three years, and one for four years. Said appointments shall commence on the same date that regular appointments to the council commence. Thereafter these appointments shall be for a term of four years. The term of existing members shall not be disturbed by the provisions of this section as amended.

(3) The governor is authorized to provide for carrying out such purposes in accordance with the standards prescribed by the surgeon general.

History.—§1, ch. 22851, 1945; §1, ch. 59-401; §§1, 10, ch. 65-47; §§19, 35, ch. 69-106; §2, ch. 71-213.

Note.—Formerly §380.01; §965.01(3).

Note.—See preamble of 1945 act.

381.502 Transition proceedings; transfer of assets, financial and physical.—

(1) Any legal commitments, contracts or other obligations heretofore entered into or assumed by the Florida development commission in connection with the federal hospital survey and construction program pursuant to state and federal laws outstanding on the effective date of this law are charged to and shall be performed by the division of administrative services of the department of health and rehabilitative services.

(2) The Florida development commission shall on the effective date of this act, transfer and convey by deed or other legal instrument properly executed to the board of commissioners of state institutions all property both real and personal owned by it on the effective date of this act required for and utilized by the hospital construction department of the commission, whether or not it was acquired from a federal agency.

(3) The state treasurer is authorized and directed to transfer to the board of commissioners of state institutions on the effective date of this act any unexpended budget and trust funds in the hospital construction accounts.

(4) All records, files and papers of any nature pertaining to the function of the hospital survey and construction department of the Florida development commission shall be turned over to the board of commissioners of state institutions.

(5) Rules and regulations adopted by the board of commissioners of state institutions as the official agency of the state to work with federal agencies in connection with the hospital survey and construction department in effect on the effective date of this act shall remain in full force and effect unless and until superseded, or amended under the provisions of this chapter.

(6) Any hearing or other proceeding scheduled pertaining to the Hill-Burton program shall be deemed transferred to the division of planning and evaluation and shall be carried on and determined by said division in accordance with the law and rules and regulations governing such hearings.

(7) The division of planning and evaluation is authorized to appoint or employ such agents, officers, or employees as it shall deem necessary for carrying out the provisions of this act. The officers or employees of the bureau of community hospitals and medical facilities of the division of administrative services employed on the effective date of this act shall continue their employment and such employment shall be in accordance with §291d.(a)(8)42, USCA.

(8) The department of health and rehabilitative services is authorized, with the advice of the state advisory council, to adopt, promulgate, and repeal rules to implement the provisions, and carry out the purpose, of this act. In exercising the rule making power provided by this section, compliance with part I of chapter 120 shall be had.

History.—§§2-9, ch. 65-46; §§19, 35, ch. 69-106; §3, ch. 71-213.
Note.—Formerly §380.011.

381.503 The community hospital education act.—

(1) SHORT TITLE.—This section shall be known and cited as "The Community Hospital Education Act."

(2) LEGISLATIVE INTENT.—It is the intent of the legislature that health care services for the citizens of this state be upgraded and that a program for continuing these services be maintained through a plan for community medical education. The program is intended to provide additional outpatient and inpatient services, a continuing supply of highly trained physicians, graduate medical education, and a program for continuing education in professional skills for practicing physicians in the state.

(3) PROGRAM FOR COMMUNITY HOSPITAL EDUCATION; STATE AND LOCAL PLANNING.—

(a) There is established within the department of education a program for statewide medical education. It is intended that continuing medical education programs for interns and residents be established on a statewide basis. The program shall provide salary supplements for interns and residents based on policies recommended and approved by the board of regents, the community hospital education council, herein established, and the department of education.

(b) Medical institutions throughout the state, other than hospitals under the control of the board of regents, may apply to the division of universities of the department of education for grants-in-aid for financial support of their approved programs.

(c) The program shall provide a plan for community clinical teaching and training with the cooperation of the medical profession, hospitals, and clinics. The plan shall also include formal teaching opportunities for intern and resident training and advanced medical education for physicians throughout the state. In addition, the plan shall establish an off-campus medical faculty with university faculty review to be located throughout the state in local communities.

(4) COUNCIL AND DIRECTOR.—

(a) There is established the community hospital education council, hereinafter referred to as the council, which shall consist of five members; three of whom shall be directors of medical education in approved community hospital medical education programs; one of whom shall be a representative of the administration of a hospital with an approved community hospital medical education program; and one of whom shall be the dean of a medical school in this state. All of the members shall be appointed by, and serve at the pleasure of, the governor.

(b) Council membership shall cease when a member's representative status no longer exists. Members of similar representative status shall be appointed to replace retiring or resigning members of the council.

(c) The board of regents shall designate an administrator to serve as staff director. The council shall elect a chairman from among its membership. Such other personnel as may be necessary to carry out the program shall be employed as authorized by the department of education.

(5) BOARD OF REGENTS; STANDARDS.—

(a) The board of regents, with recommendations from the council, shall establish standards and policies for the use and expenditure of funds appropriated for a program of community hospital education. The board of regents shall establish requirements for hospitals to be qualified for participation in the program, which shall include, but not be limited to, the following:

1. Submission of an educational plan and a training schedule;
2. A determination by the council to ascertain that each portion of the program of the hospital provides a high degree of academic excellence and that it qualifies for approval by the Council on Education of the American Medical Association.
3. Supervision of the educational program of the hospital by a physician who is not the hospital administrator.

(b) Each participating hospital shall provide a postgraduate education program for physicians in private practice in the local area.

(c) The board of regents shall periodically review the educational program provided by a participating hospital to assure that the program includes a reasonable amount of both formal and practical training and that the formal sessions are presented as scheduled in the plan submitted by each hospital.

(6) POLICIES ESTABLISHED BY THE BOARD OF REGENTS.—The board of regents, with recommendations by the council and final approval by the department of education, shall establish policies for the use and expenditure of funds appropriated for the inter-residency program.

(7) COMMUNITY MEDICAL EDUCATION PROGRAM; FUNDING FORMULA.—There is appropriated from the general revenue fund $25,000, which shall be matched by local funds. The board of regents shall develop a formula which shall apportion said funds among the following uses:

(a) Funds for payments to be used for student remunerations;

(b) Funds for teaching assistants and teaching-related equipment to be used for salaries of nonacademic faculty and for the purchase of related teaching equipment;

(c) Funds for faculty review to be used to hire part time or per diem faculty members of

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state supported medical schools to review approved programs.

(8) STATE-LOCAL FUNDING.—State funds appropriated shall be used to match funds from community, county, and approved participating hospital or clinic sources, in compliance with the following formula:

(a) Each county or community whose hospital or clinic has been accepted by the board of regents to participate in the program shall be responsible for matching funds in an amount not to exceed 25 percent of the cost of each approved program.

(b) Each hospital or clinic accepted for participation in this program shall be responsible for matching funds of at least 50 percent of the total cost of each approved program.

(c) State funding shall not be in excess of 25 percent of the total cost of each approved program.

(9) REPORT TO LEGISLATURE.—The council shall make a report to the legislature on or before January 1 of each year on the progress of the program and funds needed for its continuance.

History.—[illegible]

381.512 Transportation of radioactive materials.—

(1) The department of health and rehabilitative services shall adopt reasonable rules and regulations governing the transportation of radioactive materials, which, in the judgment of the department, shall promote the public health, safety, or welfare and protect the environment.

(a) Such rules and regulations shall include, but shall not be limited to, provisions for the use of signs designating radioactive material cargo and for the packing, marking, loading, and handling of radioactive materials, and the precautions necessary to determine whether the material when offered is in proper condition for transport, and may include designation of routes in this state which are to be used for the transportation of radioactive materials.

(b) Such rules and regulations shall not include the equipment or operation of the carrier vehicle, nor shall they apply to transportation of radioactive material within the confines of an authorized facility of use.

(c) Such rules and regulations shall be compatible with, but not more restrictive than, those established by the United States Atomic Energy Commission, the United States Federal Aviation Agency, the United States Department of Transportation, the United States Coast Guard, or the United States Post Office.

(2)(a) Rules and regulations adopted by the department pursuant to subsection (1) may be enforced, within their respective jurisdictions, by any authorized representative of the division of health, the department of highway safety and motor vehicles, the department of transportation, and the public service commission.

(b) The division of health, through any authorized representative, is authorized to inspect any records of persons engaged in the transportation of radioactive materials during the hours of business operation when such records reasonably relate to the method or contents of packing, marking, loading, handling, or shipping of radioactive materials.

(c) The division of health, through any authorized representative, is authorized to enter upon and inspect the premises or vehicles of any person engaged in the transportation of radioactive materials during hours of business operation, with or without a warrant, for the purpose of determining compliance with the provisions of this section and the rules and regulations thereunder.

(3) Upon a finding by the division of health that any provision of this section, or the rules and regulations thereunder, are being violated or that any practice in the transportation of radioactive materials constitutes a clear and imminent danger to the public health, property, or safety, it may issue an order requiring correction.

(4) Violation of any of the provisions of this section or the rules and regulations thereunder shall constitute a misdemeanor and, upon conviction, shall be punishable according to law.

History.—§§1-4, ch. 71-271.

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CHAPTER 386

NUISANCES INJURIOUS TO HEALTH

386.01 Sanitary nuisance.
386.02 Duty of division of health.
386.03 Notice to remove nuisances; authority of division of health and local health authorities.
386.041 Nuisances injurious to health.
386.051 Nuisances injurious to health, penalty.

386.01 Sanitary nuisance.—A sanitary nuisance is the commission of any act, by an individual, municipality, organization or corporation, or the keeping, maintaining, propagation, existence or permission of anything, by an individual, municipality, organization or corporation, by which the health or life of an individual, or the health or lives of individuals, may be threatened or impaired, or by which or through which, directly or indirectly, disease may be caused.

History.—§1, ch. 4346, 1896; GS 1153; RGS 2157; CGL 3386.

386.02 Duty of division of health.—The division of health of the department of health and rehabilitative services, upon request of the proper authorities, or of any three responsible resident citizens, or whenever it may seem necessary to the division of health, shall investigate the sanitary condition of any city, town or place in the state; and if, upon examination, the division of health shall ascertain the existence of any sanitary nuisance as herein defined, it shall serve notice upon the proper party or parties to remove or abate the said nuisance or, if necessary, proceed to remove or abate the said nuisance in the manner provided in §823.01.

History.—§11, ch. 4346, 1896; GS 1154; RGS 2158; CGL 3387; §§19, 35, ch. 69-106.

386.03 Notice to remove nuisances; authority of division of health and local health authorities.—

(1) The division of health, upon determining the existence of anything or things herein declared to be nuisances by law, shall notify the person or persons committing, creating, keeping or maintaining the same, to remove or cause to be removed, the same within twenty-four hours, or such other reasonable time as may be determined by the division of health, after such notice be duly given.

(2) If the sanitary nuisance condition is not removed by such person or persons within the time prescribed in said notice, the division of health, its agents or deputies or local health authorities, may within the county where the nuisance exists, remove, cause to remove, or prevent the continuing sanitary nuisance condition in the following manner:

(a) Undertake required correctional procedures, including the removal of same if necessary; the cost or expense of such removal or correctional procedures shall be paid by the person or persons committing, creating, keeping or maintaining such nuisances; and if the said cost and expense thus accruing shall not be paid within ten days after such removal, the same shall be collected from the person or persons committing, creating, keeping or maintaining such nuisances, by suit at law; but this paragraph shall not authorize the division of health to alter, change, demolish or remove any machinery, equipment or facility designed or used for the processing or disposing of liquid or smoke effluent of a manufacturing plant.

(b) Institute criminal proceedings in county or municipal courts, in whose jurisdiction the condition exists, against all persons failing to comply with notices to correct sanitary nuisance conditions as provided in this chapter; or,

(c) Institute legal proceedings authorized by the division of health as set forth in §381.031(4).

History.—§12, ch. 4346, 1895; GS 1155; RGS 2159; CGL 3388; §1, ch. 63-64; §§19, 35, ch. 69-106.

386.041 Nuisances injurious to health.—

(1) The following conditions existing, permitted, maintained, kept, or caused by any individual, municipal organization or corporation, governmental or private, shall constitute prima facie evidence of maintaining a nuisance injurious to health:

(a) Untreated or improperly treated human waste, garbage, offal, dead animals or dangerous waste materials from manufacturing processes harmful to human or animal life and air pollutants, gases and noisome odors which are harmful to human or animal life.

(b) Improperly built or maintained septic tanks, water closets or privies.

(c) The keeping of diseased animals dangerous to human health.

(d) Unclean or filthy places where animals are slaughtered.

(e) The creation, maintenance or causing of any condition capable of breeding flies, mosquitoes or other arthropods capable of transmitting diseases, directly or indirectly to humans.

(f) Any other condition determined to be a sanitary nuisance as defined in §386.01.

(2) The division of health, its agents and deputies, or local health authorities are authorized to investigate any condition or alleged nuisance in any city, town or place within the state, and if such condition is determined to constitute a sanitary nuisance they may take such action to abate the said nuisance condition in accordance with the provisions of this chapter.

History.—§2, ch. 63-64; §§19, 35, ch. 69-106.

386.051 Nuisances injurious to health, penalty.—Any person found guilty of creating, keeping or maintaining a nuisance injurious to health shall be guilty of a misdemeanor of the second degree, punishable as provided in §775.082 or §775.083.

History.—§2, ch. 6561, §347, ch. 71-136.

tinctive elements comprising such offenses, regardless of whether such law is established by constitutional provision, statute, court rule or court decision.

History.—§2, ch. 71-136.
*__Note.__—Effective January 1, 1972.

***775.082 Penalties for felonies and misdemeanors.**—

(1) A person who has been convicted of a capital felony shall be punished by death unless the verdict includes a recommendation to mercy by a majority of the jury, in which case the punishment shall be life imprisonment. A defendant found guilty by the court of a capital felony on a plea of guilty or when a jury is waived shall be sentenced to death or life imprisonment, in the discretion of the court.

(2) A person who has been convicted of any other designated felony may be punished as follows:

(a) For a felony of the first degree, by a term of imprisonment in the state penitentiary not exceeding 30 years or, when specifically provided by statute, by imprisonment in the state penitentiary for a term of years not exceeding life imprisonment.

(b) For a felony of the second degree, by a term of imprisonment in the state penitentiary not exceeding 15 years.

(c) For a felony of the third degree, by a term of imprisonment in the state penitentiary not exceeding 5 years.

(3) A person who has been convicted of a designated misdemeanor may be sentenced as follows:

(a) For a misdemeanor of the first degree, by a definite term of imprisonment in the county jail not exceeding 1 year;

(b) For a misdemeanor of the second degree, by a definite term of imprisonment in the county jail not exceeding 60 days.

(4) Nothing in this section shall be construed to alter the operation of any statute of this state authorizing a trial court, in its discretion, to impose a sentence of imprisonment for an indeterminate period within minimum and maximum limits as provided by law.

History.—§3, ch. 71-136.
*__Note.__—Effective January 1, 1972.

***775.083 Fine in lieu of, or in addition to, other criminal penalty.**—A person who has been convicted of a crime, other than a capital felony, may be sentenced, when specifically designated by statute, to pay a fine in lieu of or in addition to any punishment described in §775.082. Fines for designated crimes shall not exceed:

(1) $10,000, when the conviction is of a felony of the first or second degree;

(2) $5000, when the conviction is of a felony of the third degree;

(3) $1000, when the conviction is of a misdemeanor of the first degree;

(4) $500, when the conviction is of a misdemeanor of the second degree;

(5) Any higher amount equal to double the pecuniary gain derived from the offense by the offender or double the pecuniary loss suffered by the victim.

(6) Any higher amount specifically authorized by statute.

History.—§4, ch. 71-136.
*__Note.__—Effective January 1, 1972.

***775.084 Subsequent felony offenders; extended terms.**—

(1) Unless otherwise specifically provided by statute, the court may sentence a person who has been convicted of a felony within this state to punishments provided in this section if it finds all the following:

(a) The imposition of sentence under this section is necessary for the protection of the public from further criminal activity by the defendant.

(b) The defendant is over seventeen years of age at the time sentence is to be imposed under this section.

(c) The defendant has previously committed a felony in this state or another qualified offense which was committed after the defendant's seventeenth birthday. For the purpose of this subsection, the term "qualified offense" includes any crime in violation of a law of another state or of the United States that was punishable under the laws of such state or the United States at the time of its commission by the defendant by death or imprisonment exceeding one year.

(d) The felony for which the defendant is to be sentenced was committed within five years of the date of the commission of the last prior felony or other qualified offense of which he was convicted, or within five years of the defendant's release, on parole or otherwise, from a prison sentence or other commitment imposed as a result of a prior conviction for a felony or other qualified offense, whichever is later.

(e) The defendant has not received a pardon on the ground of innocence for any felony or other qualified offense that is necessary for the operation of this section.

(f) A conviction of a felony or other qualified offense necessary to the operation of this section has not been set aside in any post-conviction proceeding.

(2) Under this section a person whose guilt of the commission of a felony under Florida law has been legally established and has been granted probation without an adjudication of guilt and who, during such probationary period, has committed the felony for which he is to be sentenced, shall have the felony for which the probation was granted treated in the same manner as a conviction thereof in the event the probation is not revoked and an adjudication of

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768.23 Protection of minors and incompetents.—The court shall provide protection for any amount awarded for the benefit of a minor child or an incompetent pursuant to the Florida guardianship law.

History.—§1, ch. 72-35.

768.24 Death of a survivor before judgment.—A survivor's death before final judgment shall limit the survivor's recovery to lost support and services to the date of his death. The personal representative shall pay the amount recovered to the personal representative of the deceased survivor.

History.—§1, ch. 72-35.

768.25 Court approval of settlements.—While an action under this act is pending, no settlement as to amount or apportionment among the beneficiaries which is objected to by any survivor or which affects a survivor who is a minor or an incompetent shall be effective unless approved by the court.

History.—§1, ch. 72-35.

768.26 Litigation expenses.—Attorneys' fees and other expenses of litigation shall be paid by the personal representative and deducted from the awards to the survivors and the estate in proportion to the amounts awarded to them, but expenses incurred for the benefit of a particular survivor or the estate shall be paid from their awards.

History.—§1, ch. 72-35.

768.27 Effective date.—Sections 768.16-768.27 shall take effect on July 1, 1972, and shall not apply to deaths occurring before that date.

History.—§1, ch. 72-35.

CHAPTER 775

DEFINITIONS; GENERAL PENALTIES; REGISTRATION OF CRIMINALS

775.082 Penalties for felonies and misdemeanors.

775.082 Penalties for felonies and misdemeanors.—

(1) A person who has been convicted of a capital felony shall be punished by death unless the verdict includes a recommendation to mercy by a majority of the jury, in which case the punishment shall be life imprisonment. A defendant found guilty by the court of a capital felony on a plea of guilty or when a jury is waived shall be sentenced to death or life imprisonment, in the discretion of the court.

*(2) In the event the death penalty in a capital felony is held to be unconstitutional by the Florida Supreme Court or the United States Supreme Court, a person who has been convicted of a capital felony shall be punished by life imprisonment.

*(3) In the event the death penalty in a capital felony is held to be unconstitutional by the Florida Supreme Court or the United States Supreme Court, the court having jurisdiction over a person previously sentenced to death for a capital felony shall cause such person to be brought before the court, and the court shall sentence such person to life imprisonment with no eligibility for parole.

(4) A person who has been convicted of any other designated felony may be punished as follows:

(a) For a felony of the first degree, by a term of imprisonment in the state penitentiary not exceeding 30 years or, when specifically provided by statute, by imprisonment in the state penitentiary for a term of years not exceeding life imprisonment.

(b) For a felony of the second degree, by a term of imprisonment in the state penitentiary not exceeding 15 years.

(c) For a felony of the third degree, by a term of imprisonment in the state penitentiary not exceeding 5 years.

(5) A person who has been convicted of a designated misdemeanor may be sentenced as follows:

(a) For a misdemeanor of the first degree, by a definite term of imprisonment in the county jail not exceeding 1 year;

(b) For a misdemeanor of the second degree, by a definite term of imprisonment in the county jail not exceeding 60 days.

(6) Nothing in this section shall be construed to alter the operation of any statute of this state authorizing a trial court, in its discretion, to impose a sentence of imprisonment for an indeterminate period within minimum and maximum limits as provided by law.

History.—[illegible] ch. 71-136; §§1, 2, ch. 72-118.

*Note.—Subsections (2) and (3) effective October 1, 1972.

CHAPTER 776

PRINCIPALS AND ACCESSORIES; ATTEMPTS

776.04 Attempts, generally.

***776.04 Attempts, generally.**—Whoever attempts to commit an offense prohibited by law and in such attempt does any act toward the commission of such an offense, but fails in the perpetration, or is intercepted or prevented in the execution of the same, shall, when no

RULES

STATE OF FLORIDA

DEPARTMENT OF HEALTH AND REHABILITATIVE SERVICES

DIVISION OF HEALTH

CHAPTER 10D-4

WATER SUPPLIES

10D-4.01 Definitions.
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10D-4.15 Potable water in places serving the public.

10D-4.01 Definitions.

(1) "Public Water Supply System" — a system serving more than twenty-five persons or otherwise making water available to public groupings or the public in general; including works and auxiliaries for collection, treatment, storage, and distribution of water from a source or sources of supply to the free-flowing outlet of the ultimate consumer.

(2) "Potable Water" — water satisfactory for drinking, culinary and domestic purposes meeting the quality standards of the Division of Health, Department of Health and Rehabilitative Services.

(3) "Adequate protection by natural means" is taken to mean one or more of the following processes of nature that produces water consistently meeting the requirements of the Standards in Section 10D-4.03, dilution, storage, sedimentation, sunlight, aeration, and the associated physical and biological processes which tend to accomplish natural purification in surface waters and, in the case of ground waters, the natural purification of water by infiltration through soil and percolation through underlying material and storage below the ground water table, as may be approved by the Division of Health.

(4) "Adequate protection by treatment" — any one or any combination of the controlled processes of coagulation, sedimentation, absorption, filtration, disinfection, or other processes which produce a water consistently meeting the requirements of the Standards in Section 10D-4.03 including processes which are appropriate to the source of supply; works which are of adequate capacity to meet maximum demands without creating health hazards, and which are located, designed, and constructed to eliminate or prevent pollution; and conscientious operation by well-trained and competent personnel whose qualifications are commensurate with the responsibilities of the position and acceptable to the Division of Health.

(5) "The coliform group" — includes all organisms considered in the coliform group as set forth in Standard Methods for the Examination of Water and Waste Water, current edition, prepared and published jointly by the American Public Health Association, American Water Works Association, and Water Pollution Control Federation.

(6) "Health hazards" — any conditions, devices, or practices in a water supply system or its operation which create a possible danger to the health and well-being of the water consumer. (An example of a health hazard is a structual defect in the water supply system, whether of location, design, or construction, which may regularly or occasionally prevent satisfactory purification of the water supply or cause it to be polluted from extraneous sources.)

(7) "Pollution" — the presence of any foreign substance (organic, inorganic, radiological, or biological) in water which tends to degrade its quality so as to constitute a hazard or impair the usefulness of the water.

(8) "The standard sample" is taken to mean that for the bacteriological test it shall consist of:

(a) For the bacteriological fermentation tube test, five (5) standard portions of either:

1. Ten milliliters (10 ml)
2. One hundred milliliters (100 ml)

(b) For the membrane filter technique, not less than fifty milliliters (50 ml).

(9) "Cross-connection" — any physical connection or arrangement between two otherwise separate piping systems, one of which contains or is designed to contain potable water and the other water or other fluid or material of unknown or questionable safety, whereby water or other fluid or material may flow from one system to the other, the direction of flow depending on the pressure or temperature differential between the two systems.

(10) "Well" — any artificial opening in the ground designed to conduct water from a source bed to the surface, by pumping or natural flow, when water from such well is used or is to be used for a public water supply system.

(11) "Source bed" — the stratum or strata

from which water is drawn in the well.

(12) "Casing" — the tubular material utilized to shut off or exclude a stratum or strata other than the source bed and conduct water from only the source bed to the surface.

(13) "Annular space" — the space between two casings or between the outer casing and the wall of the well hole.

(14) "Individual water supply" — a well or other source of water, and pump and piping if any, located on the premises served for supplying only a single home of a family.

General Authority 381.031(1)(g)3 FS. Law Implemented 381.261 FS.

10D-4.02 Water supply — general.

(1) As to source and protection of water supply for human consumption, household purposes, or otherwise made accessible to the public for drinking and culinary purposes, the water should be obtained from the most desirable source which is feasible, and effort should be made to prevent or control pollution of the source. If the source is not adequately protected by natural means as approved by the Division of Health the supply shall be adequately protected by treatment.

(2) Frequent sanitary surveys shall be made of water supply systems to locate and identify health hazards which might exist in a system. The manner and frequency of making these surveys and the rate at which discovered health hazards are to be removed shall be determined by the Division of Health.

(3) Approval of water supplies shall be dependent in part upon:

(a) Owner's program for protective measures to protect and prevent development of health hazards to the water supply

(b) Protective measures for water quality throughout all parts of the system by frequent surveys proper operation by certified personnel or same qualified by the Division of Health.

(c) Adequate system capacity to meet peak demands without development of low pressures or other health hazards;

(d) Records of laboratory examinations showing consistent compliance with the water quality requirements of Section 10D-4.03.

(4) As a basis of decision in appraising a public water supply system, the details of it will be reviewed in the light of modern sanitary engineering practices and reference may be made to applicable parts of "Manual of Recommended Water Sanitation Practice" (Public Health Bulletin No. 296, 1946, U.S. Public Health Service, Washington, D. C.), or "Water Treatment Plant Design" (Manuel of Engineering Practice No. 19, American Society of Civil Engineers, New York, N. Y.), or "A Report of Committee of the Great Lakes-Upper Mississippi River Board of State Sanitary Engineers on Policies for the Review and Approval of Plans and Specifications for Public Water Supplies" (Bulletin 42, New York State Department of Health, Albany, N. Y.), or Manual of Water Quality and Treatment, American Water Works Association, New York, N. Y., or Journals and Standards of American Water Works Association, New York, N. Y., or other similar treatises and works in addition to those specifically mentioned elsewhere in this chapter.

(5) An individual water supply is not considered to come under the regulations pertaining to a public water supply system. Provided, that nothing herein shall be construed to prohibit the Division advising and consulting with the owner of an individual water supply as to its source, purification and sanitation.

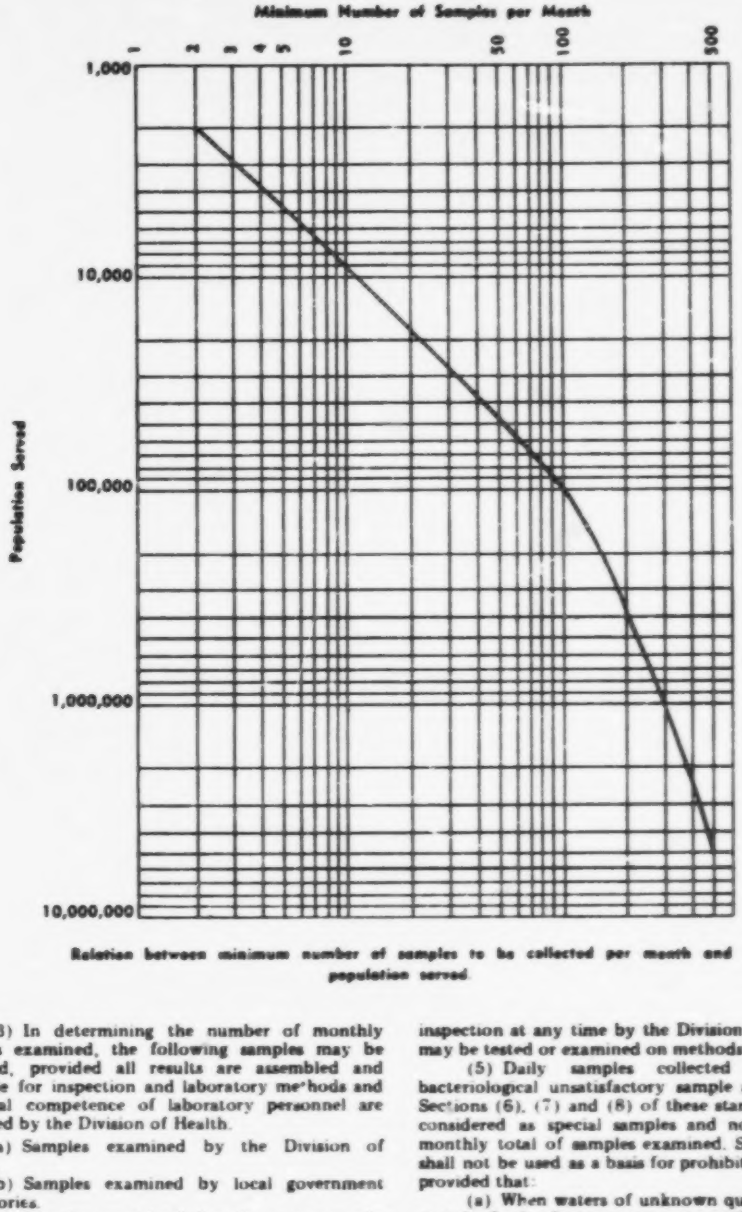
General Authority 381.031(1)(g)3 FS. Law Implemented 381.261 FS.

10D-4.03 Potable water — standards. The following standards are hereby promulgated:

(1) Bacteriological quality — sampling. Compliance with the bacteriological requirements of these standards shall be based on examinations of samples collected at representative points throughout the distribution system. The frequency of sampling and the location of sampling points shall be established by the Division after investigation of the source, method of treatment, and protection of the water concerned.

(2) The minimum number of samples to be collected from the distribution system and examined each month should be in accordance with the number on the graph in this section, for the population served by the system.

For the purpose of uniformity and simplicity in application, the number determined from the graph shall be in accordance with the following: or a population of 25,000 and under — to the nearest 1, 25,001 to 100,000 — to the nearest 5, and over 100,000 — to the nearest 10.



Relation between minimum number of samples to be collected per month and population served.

(3) In determining the number of monthly samples examined, the following samples may be included, provided all results are assembled and available for inspection and laboratory methods and technical competence of laboratory personnel are approved by the Division of Health.

(a) Samples examined by the Division of Health.

(b) Samples examined by local government laboratories.

(c) Samples examined by the water works authority.

(4) Laboratories in which water examinations are made for required reports shall be subject to inspection at any time by the Division of Health and may be tested or examined on methods used.

(5) Daily samples collected following a bacteriological unsatisfactory sample as provided in Sections (6), (7) and (8) of these standards shall be considered as special samples and not included in monthly total of samples examined. Special samples shall not be used as a basis for prohibiting the supply provided that:

(a) When waters of unknown quality are being examined simultaneous tests are made on multiple portions of a geometric series to determine a definitive coliform content.

(b) Immediate and active efforts are made to locate the cause of pollution

(c) Immediate action is taken to eliminate the cause.

(d) Samples taken following such remedial action are satisfactory.

(6) Bacterial limits — The presence of organisms of the coliform group as indicated by samples examined shall not exceed the following limits

(a) When 10 ml standard portions are examined not more than 10 percent in any month shall show the presence of the coliform group The presence of the coliform group in three or more 10 ml portions of a standard sample shall not be allowable if this occurs:

1 In two consecutive samples;

2. In more than one sample per month when less than 20 are examined per month; or

3. In more than five percent of the samples when 20 or more are examined per month.

When organisms of the coliform group occur in three or more of the 10 ml portion of a single standard sample daily samples from the same sampling point shall be collected promptly and examined until the results obtained from at least two consecutive samples show the water to be of satisfactory quality

(b) When ml standard portions are examined, not more than 60 percent in any month shall show the presence of the coliform group. The presence of the coliform group in all five of the 100 ml portions of a standard sample shall not be allowable if this occurs

1. In two consecutive samples;

2. In more than one sample per month when less than five are examined per month; or

3 In more than 20 percent of the sample when five or more are examined per month

When organisms of the coliform group occur in all five of the 100 ml portions of a single standard sample, daily samples from the same sampling point shall be collected promptly and examined until the results obtained from at least two consecutive samples show the water to be of satisfactory quality.

(c) When the membrane filter technique is used, the arithmetic mean coliform density of all standard samples examined per month shall not exceed one per 100 ml. Coliform colonies per standard sample shall not exceed 3/50 ml, 4/100 ml, 7/200 ml 13/ 00 ml in

1 Two consecutive samples

2. More than one standard sample when less than 20 are examined per month; or

3 More than five percent of the standard samples when 20 or more are examined per month.

When coliform colonies in a single standard sample exceed the above values, daily samples from the same sampling point shall be collected promptly and examined until the results obtained from at least two consecutive samples show the water to be of satisfactory quality.

(7) Physical characteristics — sampling. The frequency and manner of sampling shall be determined by the Division of Health. Under normal circumstances the Division of Health may require that samples be collected one or more times per week from representative points in the distribution system and examined for turbidity color threshold odor, and taste.

(8) Physical limits — The water shall contain no impurity which would arise offensive to the sense of sight, taste, or smell. Under general use, the following limits shall not be exceeded

Turbidity — 5 units
Color — 15 units.
Threshold odor number — 3

(9) Chemical characteristics — sampling. The frequency and manner of sampling shall be determined by the Division of Health. Under normal circumstances analyses for substances listed below need be made only semiannually. If, however, there is some presumption of unfitness because of the presence of undesirable elements, compounds, or materials, periodic determinations for the suspected toxicant or material shall be made more frequently and an exhaustive sanitary survey shall be made to determine the source of the pollution. Where the concentration of a substance is not expected to increase in processing and distribution, available and acceptable source water analyses performed in accordance with standard methods may be used as evidence of compliance with these standards

(10) Where experience examination and available evidence indicate that particular substances are consistently absent from a water supply or below levels of concern, semiannual examinations for those substances may be omitted when approved by the Division of Health Further, the analytical determinations may be reduced in certain cases by using data from sources acceptable to the Division of Health.

(11) Chemical limits — The water shall not contain impurities in concentrations which may be hazardous to the health of the consumers. It should not be excessively corrosive to the water supply system Substances used in its treatment shall not remain in the water in concentrations greater than required by good practice. Substances which may have deleterious physiological effect, or for which physiological effects are not known, shall not be introduced into the system in a manner which would permit them to reach the consumer.

(12) The following chemical substances should not be present in a water supply in excess of the listed concentrations where, in the judgment of the Division of Health, other more suitable supplies are or can be made available.

Substance	Concentration in mg/1
Alkyl Benzen Sulfonate (ABS)	0.5
Arsenic (As)	0.01
Chloride (C1)	250
Copper (Cu)	1.0
Carbon Chloroform Extract (CCE)	0.2
Cyanide (CN)	0.01
Fluoride (F)	(*)
Iron (Fe)	0.3
Manganese (Mn)	0.05
Nitrate' (NO$_3$)	45
Phenols	0.001
Sulfate (SO$_4$)	250
Total Dissolved Solids	500
Zinc (Zn)	5

*See 10D-4.03 (14)

In areas in which the nitrate content of water is known to be in excess the listed concentration, the public should be warned of the potential dangers of using the water for infant feeding

(13) The presence of the following substances in excess of the concentrations listed shall constitute grounds for rejection of the supply:

Substance	Concentration in mg/1
Arsenic (As)	0.05
Barium (Ba)	1.0
Cadmium (Cd)	0.01
Chromium (Hexavalent) (Cr + *)	0.05
Cyanide (CN)	0.2
Fluoride (F)	(*)
Lead (Pb)	0.05
Selenium (Se)	0.01
Silver (Ag)	0.05

*See 10D-4.03 (14)

(14)

(a) When fluoride is natuarally present in drinking water, the concentration should not average more than the appropriate upper limit in the tabulation in this section. Presence of fluoride in average concentrations greater than two times the optimum values in the tabulation in this section shall constitute grounds for rejection of the supply.

(b) Where fluoridation program (supplementation of fluoride in drinking water) is practiced, the average fluoride concentration shall be kept within the upper and lower control limits according to the following table:

Annual average of maximum daily air Temperatures, degrees Fahrenheit*	Control Limits (Fluoride concentrations in mg/1)		
	Lower	Optimum	Upper
63.9-70.6	0.7	0.9	1.2
70.7-79.2	0.7	0.8	1.0
79.3-90.5	0.6	0.7	0.8

*Based on temperature data obtained for a minimum of five years.

(c) In addition to the sampling required by paragraph (9) of this section, fluoridated and defluoridated supplies shall be sampled with sufficient frequency to determine that the desired fluoride concentration is maintained.

(15) Radioactivity — sampling. The frequency of sampling and analysis for radioactivity shall be determined by the board after consideration of the likelihood of significant amounts being present. Where concentrations of Ra-226 or Sr-90 may vary considerably, quarterly samples composited over a period of three months may be required. Samples for determination of gross activity may be required to be taken and analyzed more frequently. As indicated in 10D-4.03, (10), data from acceptable sources may be used to indicate compliance with these requirements.

(16) Radioactivity limits — The effects of human radiation exposure are viewed as harmful and any unnecessary exposure to ionizing radiation should be avoided. Approval of water supplies containing radioactive materials shall be based upon the judgment that the radioactivity intake from such water supplies when added to that from all other sources is not likely to result in an intake greater than the radiation protection guidance recommended by the Federal Radiation Council and approved by the President. It is recommended that routine control of useful applications of radiation and atomic energy should be such that expected average exposures of suitable samples of an exposed population group will not exceed the upper value of Range II (20 uuc/day of Radium-226 and 200 uuc/day of Strontium-90). Water supplies shall be approved without further consideration of other sources of radioactivity intake of Radium-226 and Strontium-90 when the water contains these substances in amounts not exceeding 3 and 10 uuc/liter, respectively. When these concentrations are exceeded, a water supply shall be approved by the Division of Health if surveillance of total intakes of radioactivity from all sources indicates that such intakes are within the limits recommended by the Federal Radiation Council for control action.

(17) In absence of Strontium-90 and alpha emitters, the water supply is acceptable when the gross beta concentrations do not exceed 1,000 uuc/liter. Provided, absence is taken here to mean a negligibly small fraction of the above specific limits, where the limit for unidentified alpha emitters is taken as the listed limit for Radium-226. Gross beta concentrations in excess of 1,000 uuc/liter shall be grounds for rejection of supply except when more complete analyses indicate that concentrations of nuclides are not likely to cause exposures greater than the Radiation Protection Guides as approved by the President on recommendation of the Federal Radiation Council.

(18) Analytical methods.

Analytical methods to determine compliance with the requirements of these standards shall be those specified in Standard Methods for the Examination of Water and Wastewater, Am. Pub. Health Assoc., current edition and those specified as follows:

(a) Barium: Methods for the Collection and Analyses of Water Samples, Water Supply Paper No. 1454, Rainwater, F. H. & Thatcher, L. L., U. S. Geological Survey, Washington, D. C.

(b) Carbon Chloroform Extract (CCE): Manual for Recovery and Identification of Organic Chemicals in Water, Middleton, F. M., Rosen, A. A., and Burttschell, R. M., Robert A. Taft Sanitary Engineering Center, PHS, Cincinnati, Ohio.

(c) Radioactivity: Laboratory Manual of Methodology, Radionuclide Analyses of Environmental Samples, Technical Report R59-6, Robert A. Taft Sanitary Engineering Center, PHS, Cincinnati, Ohio, and Methods of Radiochemical Analysis, Technical Report No. 173, Report of the Joint WHO-FAO Committee, 1959, World Health Organization.

(d) Selenium: Suggested Modified Method of Colorimetric Determination of Selenium in Natural Water, Magin, G. B., Thatcher, L. L., Rettig, S., and Levine, H., J. Am. Water Works Assoc. 52, 1199 (1960).

(e) Organisms of the coliform group: All of the details of techniques in the determination of bacteria of this group, including the selection and preparation of apparatus and media, the collection and handling of samples and the intervals and conditions of storage allowable between collection and examination of the water sample, shall be in accordance with Standard

Methods for the Examination of Water and Wastewater, current edition, and the procedures shall be those specified therein for:

1. The Membrane Filter Technique Standard Test.

2. The Completed Test,

3. The Confirmed Test procedure with brilliant green lactose bile broth, provided that the Confirmed Test is allowed, provided the value of this test to determine the sanitary quality of the specific water supply being examined is established beyond reasonable doubt by comparisons with Completed Tests performed on the same water supply, or

4. The Confirmed Test, procedure with Endo or eosin methylene blue agar plates.

General Authority 381.031(1)(g)3 FS. Law Implemented 381.261 FS.

10D-4.04 Public water supply systems – approval. No person, persons, firm, corporation, company, institution, municipality, or community shall install, extend, or alter any public water supply system without first having received written approval from the Division of Health. Approval shall be voided [illegible] proposed construction covered thereby is not commenced within one year of date of approval. However, at the Division of Health's discretion the project may be re-approved upon written application to the Division of Health.

General Authority 381.031(1)(g)3 FS. Law Implemented 381.271 FS.

10D-4.05 Public water supply systems – applications. Upon request, the Division of Health shall provide application forms necessary for Division of Health approval of water supply systems. All applications shall be submitted in quadruplicate and shall contain the following information:

(1) Certificate that the plans for the project have been approved by the governing body of the applicant (city commissioners, corporation, board, etc.)

(2) Comprehensive engineer's report describing the project, basis of design, including design data and such pertinent data to give an accurate understanding of work to be undertaken and reasons therefor.

(3) Prints of drawings of the work project which contain sufficient detail to clearly apprise the Division of Health of the work to be undertaken. All prints shall be minimum 18 x 24 inch size, and a maximum size of 36 x 42 inches, and the scale of details contained shall be satisfactory for microfilm reproduction. (Reduced size photographic reproduction of drawings for submission may be authorized.)

(4) Complete specifications of the project necessary to supplement prints submitted.

(5) Such additional data as may be requested by the Division of Health after initial application for purposes of clarification anticipated used, or to support any changes in the scope of the project, actual or anticipated.

(6) All drawings, specifications and data required with the application shall be prepared by an engineer or engineers licensed in the state under the provision of Chapter 471, FS, and shall fulfill the requirements of Section 471.30, FS.

(7) To provide better coordination and more rapid handling of applications relating to public water supply systems, an additional set of documents shall be furnished to local health authorities. Projects covered are those normally processed through the central office of the Division of Health exclusive of those for incorporated municipalities, districts, governmental institutions and include facilities for such as trailer parks, subdivisions, schools and others of similar nature.

(a) The additional set of documents for projects in counties having sanitary engineers assigned to health departments shall be transmitted directly to such health departments. For all other counties the additional set of documents shall be forwarded to the Division of Health for further distribution to applicable local county health departments.

(b) Local county health departments will review and report to the Division of Health only on such aspects as facility location or local restrictions. Only county health departments with staff sanitary engineers may comment on technical details of design features and operation. If local circumstances necessitate delay of more than five (5) days after receipt of documents by local county health department, the Division of Health shall be notified. If the Division of Health receives no comments from the health department within ten (10) days of date of transmittal, it shall be presumed local authorities have no comments and documents shall be processed with due speed.

General Authority 381.031(1)(g)3 FS. Law Implemented 381.271 FS.

10D-4.06 Public water supply system plans – alterations. Upon approval of the Division of Health a complete set of the approved plans, specifications, application, and other data shall be returned to the applicant. Provided, the Division of Health may in its discretion return such complete set of approved plans and related material to the registered professional engineer authorized to represent the applicant. Any and all construction, alteration or extension of public water supply systems shall be in accordance with such Division approved plans. Provided, appropriate changes in a specific project may be made only on prior written approval and consent of the Division.

General Authority 381.031(1)(g)3 FS. Law Implemented 381.271 FS.

10D-4.07 Public water supply systems – cleaning & disinfection. No person, board, or municipality charged with the management or control of a public water supply shall put into service any new plant, pumping station, main, standpipe, reservoir, tank, or other pipe or structure through which water is delivered to consumers for potable or household purposes, nor resume the use of any such structure, facilities, or main after it has been cleaned, until such structure, facilities or main has been effectively sterilized or disinfected. Provided, that this may not necessarily apply to mains, reservoirs, tanks, or other structures, the waters from which are subsequently treated or purified.

General Authority 381.031(1)(g)3 FS. Law Implemented 381.031(1)(g)3 FS.

10D-4.08 Public water supply systems – operation.

(1) Operation of works according to approved plans — Upon construction of the water works, the owner or person responsible for its operation shall keep in service all items designed for the purification of the water supply, or its protection from pollution,

to perform adequately the function for which such were designed.

(2) Water works under competent supervision — The municipal officers of a municipally-owned works and the owners of other public water supplies shall provide responsible personnel for the operation of the water works, who shall have had experience in such work, and a knowledge of the basic scientific principles relating to the purification and proper protection of the water supply. At the discretion of the Division, certification of operator or operators of a specific public water supply system in appropriate grade or class under the voluntary certification plan incorporated in the constitution and by-laws of the Florida Water and Sewage Works Operators Association, may be deemed to have satisfied the requirements of this paragraph. Also at its discretion the Division may use as a guide in determining compliance with requirements of this paragraph, the program of voluntary certification for water works operators as prepared by the joint committee on operator certification and training of the American Water Works Association, the Conference of State Sanitary Engineers and the Water Pollution Control Federation.

(3) Water samples for laboratory test — The person responsible for the operation of all public water works shall submit to the Laboratory of the Division of Health such samples of the water, in such manner, and at such time, as stipulated in Section 10D-4.03, or as he may otherwise be directed by the Division. Each water supply owner shall at his own expense provide for the purpose a shipping container for samples, according to specifications obtainable upon request from the board, so that samples may be iced for shipping to the Laboratory.

(4) Bacteriological, chemical and physical quality — Public water supply systems relying only on protection by natural means or utilizing treatment facilities shall be operated at all times in a manner to produce water meeting requirements stipulated in Section 10D-4.03.

(5) Abnormal occurrences to be reported — No new source of water supply shall be introduced into the system, and no purification process or protective provision be altered or discontinued, except where the water works operator notifies the Division of Health and secures written approval therefrom. In case of a breakdown in purification or protective works occurring, or where any suspicious circumstances or abnomal taste or odor occurs in connection with a public water supply, it shall be the duty of the person responsible for the operation of the works to notify immediately the Division by wire or telephone. Provided, however, that where there is an approved local health organization the local health officer shall be notified, and it shall be his duty to notify the Division of Health.

(6) Chlorine disinfection required — All public water supplies shall be equipped with the necessary apparatus and shall apply continuously to the water chlorine in sufficient quantities to maintain a chlorine residual in all parts of the system. Provided, however, that this requirement may be waived by the Division of Health, in the case of deep-seated well supplies, whose adequate protection has been assumed and laboratory tests confirm the safe character of the water.

(7) Water plant records to be furnished Division of Health — The person in responsible charge of a public water sustem shall record such operating data and tests on forms and in a manner as prescribed by the Division of Health, and shall transmit such records to the Division of Health as it may specify.

(8) Fluoridation — Inasmuch as present experimental evidence indicates that artificial fluoridation of public water supplies, under adequate supervisory control, will result in a significant reduction in tooth decay among children in communities utilizing this water treatment process, and so far no harmful effects from this treatment have been demonstrated, the Division feels justified in approving the application of fluoride to public water supplies deficient in this element, under controlled conditions, provided the following requirements shall be complied with:

(a) Prior to placing treatment in effect which involves applying sodium fluoride or similar compounds to a public water supply the following shall be accomplished:

1. An expression in writing from the appropriate city official to the Division of Health requesting permission to apply fluorides to the local water supply under supervision of the Division of Health; compliance with Sections 10D-4.04, 4.05, and 4.06.

2. Approval in writing for fluoridation from local medical society; local dental society, local board of health; local health department, submission of copies of these written approvals to the Division of Health.

3. Passage of an ordinance by the city governing body directing the water department to provide the means and to proceed with the introduction of fluoride to the water supply as directed by the Division of Health.

4. The municipality provide a qualified technician to personally supervise this treatment process and whose qualifications are approved by the Division of Health. (This technicial must possess an unrevoked Class "B" water works operator's certificate as issued under the certification plan of the Florida Water and Sewage Works Operators Association. A state plant operator not already holding a Class "B" water works operator's certificate issued under the certification plan of the Florida Water and Sewage Workers Operators Association, or the approved equivalent as issued under some other state certification plan, must obtain a Class "B" water works operator's certificate under said certification plan before he (or she) will be approved by the Division as the operator-in-charge of fluoridation treatment.)

(b) Fluoride content (as F) shall be maintained in accord with Section 10D-4.03(14)(b).

(c) Water sampling including special sample in compliance with Section 10D-4.03(14)(c).

(d) Complete records and special reports in compliance with Section 10D-4.08(7).

General Authority 381.031(1)(g)3 FS. Law Implemented 381.261 FS.

10D-4.09 Public water supply systems — cross-connections & use of dual supplies.

(1) Certain cross-connections prohibited — No officers, board, corporation, municipality or other persons having the management of a public water supply shall permit any physical connection between

the distribution system of such supply and that of any other water supply unless such other supply is regularly examined as to its quality by those in charge of the public supply to which the connection is made and is also found to be safe and potable. This provision shall apply to all water distribution systems either inside or outside of any building or buildings.

(2) Permissible arrangement where dual supplies are used — If a potable water supply is used as an auxiliary supply delivered to an elevated tank, or to a suction tank, which tank is also supplied with water from a source with which cross-connections are not permitted by Section 10D-4.09(1), such tank shall be opened to atmospheric pressure and the potable water supply shall be discharged at an elevation above the high water line of the tank.

General Authority 381.031(1)(g)3 FS. Law Implemented 381.261 FS.

10D-4.10 Water supply wells — drilling permit, application. No water supply well shall be constructed or used until a written permit from the Division of Health has first been received by the owner and driller of the well.

(1) Application for permit — Before commencing the construction of a water supply well, it shall be the responsibility of the well drilling contractor to make application and obtain permit so to do from the Division of Health. Form for application for permit shall be obtainable from the Division of Health upon request. The application shall be signed by the driller of the proposed well and also by the person, municipal or public utility official, corporation president, or other owner of the proposed well.

(2) Data to be submitted with application — The application shall furnish and be accompanied by the following data:

(a) Type of construction, casing material, proposed depth and diameter, proposed type of casing seat, required yield, and nature of place to be supplied by the well water.

(b) A plat showing the location of the proposed well relative to existing physical features. The location of known possible sources of contamination must be shown.

(c) Additional data as may be required by the Division of Health.

General Authority 381.031(1)(g)3 FS. Law Implemented 381.261, 381.271 FS.

10D-4.11 Water supply wells — location, construction. The details of location and construction of a water supply well shall include the following:

(1) Terrain — Well sites shall be on ground not subject to ponding or flooding. In general, the slope of the ground surface in the vicinity of the well sites shall be away from well, if practical. For level areas, well-tamped or puddled earth shall be placed around the well so as to elevate the platform or apron.

(2) Sanitary hazards — As far as is practical, when the direction of ground water slope or movement is known, wells shall be located on the upstream side of possible sources of pollution and as far from these sources as practical. A 100-foot separation distance between the well and sanitary hazards such as sanitary sewers, septic tanks and sewage or waste water disposal areas, is considered minimum precaution.

(3) Access — Every well shall be accessible for such attention as may be necessary.

(4) Casing —

(a) In wells in which the casing is driven it shall be of the type known as drive pipe, and shall be equipped with couplings allowing for butt joints between lengths of casing. For wells in which the casing is not driven "merchant casing," standard pipe or pipe especially constructed for gravel wall wells will be acceptable. Any other pipe proposed shall be approved by the Division of Health.

(b) Where telescoped casing is utilized, an approved watertight seal shall be made where increases or reductions occur in casing size. If proper seals are not made, the inner casing should extend the entire cased depth.

(c) Where water is obtained from limestone strata, casing must extend sufficiently far into unbroken limestone to be seated firmly in it and sealed with cement grout by an approved method.

(d) Wells drilled by the rotary method shall have the annular space sealed by the use of a neat cement grout at the bottom of the hole and to the surface by neat cement, clay or other approved material.

(e) The top of the casing shall be so constructed as to exclude any influent.

(f) Previous to placing pumps, wells under construction shall be protected at all times so as to prevent entrance of contaminating material.

(5) Pump pits — Where a pump pit is planned, it must be provided with a sump pump or other means for keeping the pit completely drained at all times. At the discretion of the Division of Health, two sump pumps may be required to guard against flooding in the event that one pump may fail.

(6) Housing of well pump — Both well and pump shall be protected by a housing of adequate size having an impervious floor and weatherproof walls and roof. Provided, completely weatherproof or submersible installations need only be protected from tampering and vandalism.

(7) Well vent — Where provided, well vents shall be adequately protected.

(8) Sampling tap — A conveniently accessible, down-opening sampling tap shall be provided on the discharge side of each well pump, so that samples of raw water may be obtained from the well.

(9) Air supply in air-lift wells — If water from air-lift wells is not treated subsequently, the air supply utilized shall be protected from contaminating influences by an approved method.

(10) Dynamiting of wells — The use of dynamite or other explosives in the construction or maintenance of wells is hereby prohibited.

(11) Infiltration galleries, etc. — Dug wells, infiltration galleries and other such sources of water supply requiring rearrangement of natural features are hereby prohibited as a source of public water supply unless water is treated in a manner approved by the Division of Health.

General Authority 381.031(1)(g)3 FS. Law Implemented 381.261 FS.

10D-4.12 Water supply wells — cleanup and disinfection, use. The following procedure shall be followed as to cleaning and disinfection of water supply wells:

(1) Disinfection — Every well shall be equipped with an opening which will allow introduction of

disinfection agents and measurement of static water level drawdown or artesian pressure Before a new well or one suspected to be polluted or one which has been repaired, is placed in use it shall be pumped clean, and it shall then be disinfected in accordance with a method approved by the Division of Health and again pumped clear to remove disinfecting agent. Samples of raw water from the well must be submitted to the Bureau of Laboratories of the Division of Health for bacterial analysis as outlined in Section 10D-4.12(2), and possible use of the well will not be allowed until completion of survey and satisfactory interpretation of the results by the Division of Health.

(2) Bacteriological survey –

(a) After thoroughly pumping the well free of excess disinfecting agent, a series of 20 or more daily samples shall be collected and submitted to the laboratory the well having been pumped for a period in [illegible] minimum range of 20 to 30 minutes each day just prior to collecting the samples. Provided, in extenuating circumstances approved by the Division of Health, the survey may be reduced [illegible] of not less than duplicate samples daily for ten days the duplicate samples being collected if desired in close sequence following the aforementioned 20 to 30 minute pumping period. More than duplicate samples daily in the survey is not approved

(b) Interpretation of laboratory results in the well survey will be made in accordance with applicable parts of Section 10D-4.03, in appropriate relationship with details of the well construction the presence or absence of surface protection, the age of the well relative to possible condition of casing the well log, or other pertinent information or conditions

General Authority 381.031(1)(g)3 FS Law Implemented 381.261 FS.

10D-4.13 Water supply wells – submission of logs & drilling samples. A log showing various strata pierced by the well and a detailed drawing of the well construction shall be forwarded by the driller to the Division of Health within two days after the completion of the drilling operation. Cuttings samples at regular intervals not greater than 25 feet apart and at every change in formation, together with a log and other data as required by the Division of Interior Resources of the Department of Natural Resources, and well data reports shall be submitted by the driller to the Division of Interior Resources director when drilling is complete. Samples must show material in which casing is seated. Use of well will be prohibited until the Division of Interior Resources director has received the necessary samples. Bags and well data blanks shall be secured by application to the Division of Interior Resources of the Department of Natural Resources, Post Office Drawer 631, Tallahassee

General Authority 381.031(1)(g)3 FS Law Implemented 381.261 FS

10D-4.14 Water supply wells – abandonment. Wells no longer in use shall be plugged in a manner approved by the Division. Capping the casing top is insufficient.

General Authority 381.031(1)(g)3 FS Law Implemented 381.031(1)(g)3 FS

10D-4.15 Potable water in places serving the public.

(1) Use of public water supply required In all schools, hotels eating places, stores, factories, camps, institutions public buildings or other places where water is served to employees customers patrons or the general public, such water shall be secured from the public water supply Section 10D-[illegible] above where such supplies are available, and not the source of supply made accessible. Provided that this requirement shall not prevent large hotels institutions or industrial plants from using their own private water supply where they comply with the provisions of this code covering public water supplies

(2) Deep wells Where no public water supply is available, the water used in paragraph (1) above shall be from a source meeting the following requirements:

(a) The well from which the water is secured shall be drilled to a depth where a water of deep seated origin will be secured, and from a water bearing stratum that is overlaid by an impervious formation that will prevent the entrance of shallow ground water or protected from pollution in a manner approved by the Division of Health and in accordance with all requirements of this code pertaining to wells to serve public water supply systems

(b) The casing shall be extended above the top of the ground surface or pump well and a concrete platform provided that will divert surface drainage and prevent its entrance into the well or between casing and walls of the well. The lower end of the casing or inner casing, if two sized casings are used must be firmly seated in the impervious protecting rock and calked so that water from sources above the protecting formation cannot enter. Provided, that requirements of this paragraph shall not be construed to prohibit properly designed and installed submersible pumps

(c) Where the water is pumped, the installation of the pump and connection shall be such that there will be no contamination with surface or shallow ground water. Where a hand pump is used the pitcher type is not permitted, but a self-priming, force pump must in all cases be provided.

(d) Samples of the water after installation of the supply must be submitted to the laboratory of the Division of Health in accordance with the requirements of this code pertaining to public water supply systems and the water shall comply with standards outlined in Section 10D-4.03

(3) Cross connections prohibited – The provisions in Section 10D-4.09 prohibiting cross connections shall apply to water supplies covered in this section

(4) Certain areas where potable ground water not available – Where it is impossible to secure a potable water from deep seated underground sources, cisterns, or other types of ground water supplies that may be practicable may be permitted provided written approval is first secured from the Division of Health, and such supplies maintained in accordance with specifications accompanying such written approval

(5) Distribution – Drinking water piping shall be in accordance with Chapter 10D-9 FAC. Sanitary drinking fountains or closed containers so constructed that the water does not come into contact with the ice, shall be provided. Except where drinking fountains are used, individual drinking cups

shall be furnished. The use of a common drinking glass or cup is forbidden.

(6) Sanitary drinking fountains — Sanitary drinking fountains, if used, shall comply with the following specifications:

(a) The fountain shall be constructed of impervious material, such as vitreous china, porcelain, enameled cast iron, other metals, or stoneware.

(b) The jet of the fountain shall issue from a nozzle of nonoxidizing impervious material set at an angle from the vertical. The nozzle and every other opening in the water pipe or conductor leading to the nozzle shall be above the edge of the bowl so that such nozzle or opening will not be flooded in case a drain from the bowl of the fountain becomes clogged.

(c) The end of the nozzle shall be protected by nonoxidizing guards to prevent persons using the fountain from coming into contact with the nozzle.

(d) The inclined jet of water issuing from the nozzle shall not touch the guard, thereby causing spattering.

(e) The bowl of the fountain shall be so designed and proportioned as to be free from corners which would be difficult to clean or which would collect dirt.

(f) The bowl shall be so proportioned as to prevent unnecessary splashing at a point where the jet falls into the bowl.

(g) The drain from the fountain shall not have a direct physical connection to a waste pipe unless the drain is trapped.

(h) The water supply pipe shall be provided with an adjustable valve fitted with a loose key or an automatic valve permitting the regulation of the rate of flow of water to the fountain so that the valve manipulated by the users of the fountain will merely turn the water on or off.

(i) The height of the fountain at the drinking level shall be such as to be most convenient to persons utilizing the fountain. Several steplike elevations to the floor at fountains which will permit children of various ages to utilize the fountain, shall be provided where children are to be served.

(j) The waste opening and pipe shall be of sufficient size to carry off the water promptly. The opening shall be provided with a strainer.

General Authority 381.031(1)(g)3 FS. Law Implemented 381.261 FS.

RULES

OF THE

DEPARTMENT OF HEALTH AND REHABILITATIVE SERVICES

THE SANITARY CODE OF FLORIDA

CHAPTER 10D-11

WATER PURIFICATION TREATMENT PLANT OPERATORS CERTIFICATION

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10D-11.01 Definitions. As used in these regulations:

(1) "Water purification plant" means any plant, works, or facilities owned or maintained by any county, city, village, town, district or by any state department, agency, or authority, or by any person, firm, corporation, estate, trust, joint adventure or association which, through aeration, ionic exchange, sedimentation, filtration, the addition or removal of any substance, or through any combination thereof, changes quality of water in order to enhance its potability.

(2) "Superintendent of operators" or "operator" means any person in actual charge of the operation, supervision, or maintenance of a water purification plant, as defined herein, and shall include the operator in charge of a shift or period of operation during any part of a day, but shall not include operator trainees who may work as such for a maximum two years.

(3) "Department" means the State of Florida Department of Health and Rehabilitative Services, Division of Health.

(4) "Certificate of registration" means a document showing the name of the registrant, the date of issue, serial number and signature of those authorized herein to grant it, the certificate being manifest of satisfying operator qualifications requirements.

General Authority 381.031 (1) (g) 5, 381.261 FS. Law Implemented 381.031 (1) (g) 5 FS. History—New 11-17-70.

10D-11.02 Policy and Intent — General.

(1) It is the policy of the Department, for protection of public health and the environment, to take all reasonable action for effective and safe operation of water supply facilities serving the public, through requirement of properly qualified operations personnel for such facilities.

(2) It is the intent of this chapter to further implement Departmental policy through a prescribed procedure of qualification outline review of the individual operator's proficiency as reflected in a documented record of experience and academic attainment, and examination in operations field subject matter. An appropriately issued certificate under the provisions of this chapter shall be evidence that the operator possessing same has satisfied the required qualifications.

General Authority 381.031 (1) (g) 5, 381.261 FS. Law Implemented 381.031 (1) (g) 5 FS. History—New 11-17-70.

10D-11.03 Minimum Qualification for Certification. To be eligible for certification by the Department, the applicant shall:

(1) Be at least eighteen (18) years old, a citizen of the United States and a resident of this state.

(2) Be of good moral character as determined by the Department.

(3) For certification as a public water purification plant operator, have been actively engaged in the production, treatment, or distribution of water for a period of one (1) year prior to the date of his application.

(4) Unless entitled to certification under 10D-11.04, FAC, pass, to the satisfaction of the Department, an examination as provided for in section 10D-11.05, FAC.

(5) Unless entitled to certification under 10D-11.04, FAC, furnish evidence of having successfully accomplished a preparatory course in mathematics for water and sewage plant operators offered through the Division of Continuing Education, University of Florida, or an equivalent thereto approved by the Department.

General Authority 381.031 (1) (g) 5, 381.261 FS. Law Implemented 381.031 (1) (g) 5 FS. History—New 11-17-70.

10D-11.04 Certification of Certain Voluntarily Certified Operators and Others. The Department shall certify as an operator of a water purification plant and shall issue, consistent with requirements of these regulations, a certificate for the years 1971 and 1972, to the following:

(1) Any person meeting the minimum qualifications set forth in Section 10D-11.03, FAC, who applies for such certificate on or before December 31, 1971, a [illegible] employed as an operator of a public water purification plant on the effective date of these regulations;

(2) Any person applying on or before December 31, 1971, who holds a certificate of competency issued by the Department (formerly Florida State Board of Health) under the voluntary certification plan of Florida Water and Pollution

Control Operators Association, which certificate to remain valid shall be renewed annually thereafter under Section 10D-11.07, FAC.

(3) It is the purpose and intent to limit certificates issued under paragraph (1) above to persons who will remain employed at the respective plants where working as operator under the conditions stipulated in paragraph (1) above, and it is specifically intended that such limited certificates are not valid for employment of the holders thereof as operators at other plant or plants, and it is also specifically intended that any modification or expansion of the water plant will result in nonlimited certified operator or operators being required, except at the discretion of the Department. Pursuant to this limitation, the certificate information shall include therein appropriate plant name or designation, and description of the facility.

General Authority 381.031 (1) (g) 3, 381.261 FS. Law Implemented 381.031 (1) (g) 3 FS. History—New 11-17-70.

10D-11.05 Examinations.

(1) The Department shall hold examinations for applicants for certification as an operator of a public water purification plant who have qualified under section 10D-11.03(1), FAC, at approximately six (6) month intervals in a major city of Florida, in some convenient place to be selected by the Department. Reexaminations shall not be given within one year except at the discretion of the Department. Examinations hereunder will be given on the following subjects:

(a) Rudiments of water bacteriology in relation to waterborne diseases, the meaning of bacteriological laboratory analyses and the interpretation of results of such analyses in relation to drinking water standards of the Department.

(b) Fundamentals of chlorine application for safeguarding public water supplies and systems, other uses of chlorine in water treatment, and safety aspects of chlorination procedures.

(c) Elemental chemistry of basic water treatment processes common to Florida conditions, the interpretation of chemical and physical analyses results in relation to drinking water standards of the Department, and simple chemical dosage calculations.

(d) Operation and maintenance of water pumping equipment, storage facilities, and pipeline systems; care and general adjustment of water treatment equipment.

(e) Simple mathematical knowledge of water pumps and storage operation, volume and flow calculations, and principles pertinent to pipeline cleanup and disinfection.

(f) Use of ordinary water testing apparatus, and general information on water plant types operating in Florida.

(g) Record keeping and reports on waterworks operation and maintenance.

(h) Principles of safety in waterworks operation.

(i) Operators' responsibilities to the public health.

General Authority 381.031 (1) (g) 3, 381.261 FS. Law Implemented 381.031 (1) (g) 3 FS. History—New 11-17-70.

10D-11.06 Certification.

(1) The Department shall register and furnish a minimum certificate, as a certified operator of a water purification plant to each applicant who successfully passes the appropriate examination hereinabove set forth, and is otherwise qualified under these regulations and further, the Department shall furnish a certificate to applicants who qualify under section 10D-11.04, FAC, of these regulations.

(2) At its discretion, the Department may issue certificates in classes higher than the minimum certification, said classes to be known as Class A and Class B.

(a) In order to be eligible for Class A certification, the operator must have accumulated 12 years of recognized training and experience, of which at least four years must be actual experience.

(b) In order to be eligible for Class B certification, the operator must have accumulated eight years of recognized training and experience, of which at least two years must be actual experience.

(c) Training and experience recognized by the Department for computing eligibility shall include:

	TRAINING AND EXPERIENCE	NUMBER OF YEARS RECOGNIZED AND CREDITED
1.	Graduate of high school or approved equivalent	2
2.	Two years of college with additional training in bacteriology and chemistry	2
3.	College graduate with sanitary engineering or equivalent degree	4
4.	Successful completion of approved regional short course	1/3
5.	Successful completion of approved annual short course	1/2
6.	Successful completion of each approved correspondence course	1/2
7.	Wastewater (sewage) treatment plant operators applying under this section for advanced certification as a public water purification plant operator will be given credit for fifty percent of their actual operational experience in the wastewater (sewage) treatment plant field.	

(d) Advanced certification under this section is not mandatory, but holders of certificates in the pertinent higher classes are deemed to have satisfied the requirements for minimum certification under these regulations.

General Authority 381.031 (1) (g) 5, 381.261 FS. Law Implemented 381.031 (1) (g) 5 FS. History—New 11-17-70.

10D-11.07 Renewal of Certificate. Certificates of operators of water purification plants shall be renewed annually on or before January 1 of each year upon the submission of application on forms mailed by the Department to each holder of a certificate hereunder in the state at his last known postoffice address on or before October 31 of the preceding year. All certificates hereunder shall expire on December 31 of each year.

General Authority 381.031 (1) (g) 5, 381.261 FS. Law Implemented 381.031 (1) (g) 5 FS. History—New 11-17-70.

10D-11.08 Refusal, Revocation, or Suspension of Certificate — Advisory Board of Review.

(1) The Department may refuse to issue or renew, or may suspend or revoke a certificate hereunder for any one of any combination of the following reasons:

(a) Habitual use of intoxicating liquors, narcotics or stimulants to such an extent as to incapacitate the performance of the certified operator hereunder.

(b) Fraud in the practice as an operator of a water purification plant or deceit in obtaining certification hereunder.

(c) Conviction in this state of a felony or conviction of any offense which, if committed in the state, would constitute a felony under the laws of the state.

(2) The accused person hereunder must be given an opportunity by the Department for a public hearing, if requested by said accused person, within thirty (30) days after notice by registered mail of the charges against him hereunder.

(3) The Secretary of the Department or the Director of the Division of Health or their designee shall appoint members annually to an advisory board herewith established comprising five members, each of which shall be an operator certified and in good standing under provisions of these regulations, under the following conditions:

(a) Each member appointed shall serve a two-year term, except two of the initial appointees shall serve for only one year each; thereafter, all members shall be appointed to two-year terms.

(b) The advisory board shall elect a chairman from among its members.

(c) The advisory board shall, upon request by the Secretary of the Department or the Director of the Division of Health or their designee, review a case or cases under consideration involving charges against operators pursuant to provisions of this Chapter, and advise the said Secretary in the matter, including recommendations for disposition. Upon request of the said Secretary, the advisory board shall also review any other provisions of these regulations and shall submit recommendations for action thereon to the said Secretary. The advisory board may also, on its own initiative by majority action, submit a petition or request for review of other matters pertinent to administration of these regulations, together with recommendations thereon, to the said Secretary.

(d) Recommendations of candidates for appointment to the advisory board may be submitted by the Florida Water and Pollution Control Operators Association to the Secretary of the Department or the Director of the Division of Health or their designee, keeping in mind a reasonable balance between water and wastewater (sewage) personnel.

General Authority 381.031 (1) (g) 5, 381.261 FS. Law Implemented 381.031 (1) (g) 5 FS. History—New 11-17-70.

10D-11.09 Title and Abbreviations. Any person who holds a certificate under these regulations may use the title "certified operator" or the abbreviation "CO" to denote his certification by the Department hereunder as an operator of a water purification plant.

General Authority 381.031 (1) (g) 5, 381.261 FS. Law Implemented 381.031 (1) (g) 5 FS. History—New 11-17-70.

10D-11.10 Reciprocity. Agreements for reciprocity with states having a public water plant operators certification act or regulations and having qualifications and requirements not less than those required by these regulations may be entered into by the Department at its discretion and under such conditions as the Department may deem appropriate.

General Authority 381.031 (1) (g) 5, 381.261 FS. Law Implemented 381.031 (1) (g) 5 FS. History—New 11-17-70.

10D-11.11 Prohibited Acts.

(1) After January 1, 1971, no owner or manager of a water purification plant as defined in section 10D-11.01 hereof, shall employ any person to perform the duties of operations personnel, as such personnel are defined in section 10D-11.01 (3), FAC, in this state without a valid certificate issued pursuant to the provisions of these regulations.

(2) After January 1, 1971, no person shall perform the duties of operations personnel, as such personnel are defined in section 10D-11.01 (3) hereof, in this state without a valid certificate issued pursuant to the provisions of these regulations.

General Authority 381.031 (1) (g) 5, 381.261 FS. Law Implemented 381.031 (1) (g) 5 FS. History—New 11-17-70.

10D-11.12 Construction — Interpretation. Nothing contained in this chapter shall be construed as limiting any of the Department's functions as provided in other chapters of its rules and regulations on water supply facilities.

General Authority 381.031 (1) (g) 5, 381.261 FS. Law Implemented 381.031 (1) (g) 5 FS. History—New 11-17-70.

10D-11.13 Fees. A ten dollar ($10.00) fee shall be charged for each of the following:

(1) Examination — pursuant to Section 10D-11.05 of this chapter.

(2) Certification — pursuant to Section 10D-11.06 of this chapter.

(3) Renewal of certificate — pursuant to Section 10D-11.07 of this chapter.

General Authority 381.031 (1) (g) 5 and 381.293 (2) FS. Law Implemented 381.031 (1) (g) 5 and 381.293 (2) FS. History—New 11-18-72.

APPENDIX E

Report of a Survey of the Bureau of Laboratories Florida Division of Health

P.O. Box 210
Jacksonville, Florida 32201

by

Earl F. McFarren, Chief
Water Supply Program Support Activities
Water Supply Research Laboratories

The Water Supply Section and the water chemistry laboratory was visited on December 10 and 11, 1973. The equipment and procedures employed in the chemical analysis of water by this laboratory conforms with the provisions of Standard Methods for the Examination of Water and Wastewater (13th Edition) and with the provisions of the Public Health Drinking Water Standards except for the items marked with a cross "X" (deviation from standard) or an "O" (not being done at present). Items marked with a "U" could not be determined at the time of the survey.

Substances Determined

The laboratory routinely determines pH, odor, color, iron, sodium, calcium, fluoride, chloride, sulfate, alkalinity, hardness, and total dissolved solids. They do not do turbidity, cyanide, foaming agents, organics-carbon adsorbable, arsenic, barium, cadmium, chromium, copper, lead, manganese, selenium, silver, sodium, mercury, zinc, gross alpha, and gross beta. Thus, in summary, although they routinely analyze water for 12 substances, only six of these are required by the drinking water standards and 18 substances specified in the standards are seldom, if ever, done. In addition, four of the determinations being done are done by non-recommended methods; namely, fluoride samples (item 2d of the survey form) are not always distilled, the brucine method for nitrates (item 2f) is preferred to the phenoldisulfonic acid method because of better precision and accuracy, and the tetrahydroquinone method for sulfates is a non-standard method, as is also the bipyridine method for iron.

Laboratory Apparatus

The water laboratory has an atomic absorption spectrophotometer but it is at present being used by the occupational health section. In any case, they could use another instrument, since if they are to undertake all the required metal analyses several different instrumental set-ups are required and the work load would be too great for one instrument if these set-ups had to be continually changed. Due to the loss of several gas chromatographs (formerly provided by the EPA as part of the community study program), another gas chromatograph will be needed if pesticide analysis on water is to be undertaken. Also needed is a Hach 2100A for turbidity measurements (item 11), an expanded scale pH meter with fluoride electrode (item 15), and carbon extraction equipment for the determination of CCE (item 19). They, at present, have no radiation counting equipment (item 29), but it is presumed that the Orlando Laboratory does and that this activity could be carried out under contract with that laboratory.

Sampling

The bottles presently being used are satisfactory, however, if, as recommended, additional chemistries are undertaken, additional bottles will be needed for each sample in order to assure correct preservation. Because of the additional effort required to properly clean all the required bottles and to assure that there is no cross contamination, it is recommended that non-returnable disposable bottles be purchased for sample collection. In addition, it is recommended that all metal samples be preserved at the time of collection with nitric acid as metals such as mercury, in particular, tend to plate-out on the container wall unless acidified. Other metals such as iron, lead, and silver, are also affected to a lesser extent. Likewise, all cyanide samples should be preserved with sodium hydroxide, and nitrates and surfactants with mercuric chloride or else refrigerated.

The laboratory report form needs revision as there is no space for indicating the results obtained on analysis of water for many of the substances listed in the drinking water standards (metals, radioactivity, and CCE).

Records

According to the water supply section chief, there are approximately 1800 municipal water supplies in the state, of which about 30 are surface water supplies. However, there is no compilation or inventory available to indicate when each supply was last analyzed or for what. In addition, it is estimated that there are about 6000 semi-public water supplies in the state which have never been checked.

According to the laboratory records 260 water samples were analyzed last year for the previously mentioned 12 substances. If we assume that the 30 surface water supplies should be analyzed at least twice a year (30 x 2 = 60) and the remaining 1760 ground water supplies are composed of on the average of three wells which are to be checked at least once every three years (1760 x 3/3 = 1760), then a total of at least 1820 (1760 + 60) samples should have been analyzed last year.

Laboratory

The Sanitation Section laboratory which is responsible for examination of bedding and the chemical analysis of water supplies, consists of one combination office and laboratory about 8 by 15 ft, one laboratory about 10 x 10 ft, and another laboratory about 10 by 15 ft. If the recommended additional water chemistries are to be undertaken, the present space would have to be, at least, doubled. There is inadequate bench, hood, storage and office space available (item 38).

Quality Control

The laboratory does routinely check the quality of their distilled water, but has no routine program for checking the quality of their analyses. It is recommended that they instigate their own internal quality control program and join one of the programs which supply reference samples for check purposes.

Staff

The present staff consists of two part-time employees. One chemist who spends perhaps 10 percent of his time on supervision of the water chemistry laboratory, and one other employee who spends about 60 percent of his time on chemical analysis of water samples. If all of the recommended chemistries are to be carried out, at least, three more persons will be required. One person will be required to run the atomic absorption spectrophotometer for metal analysis, one for pesticide analysis, and another for other wet chemistries, such as, nitrates, cyanide, surfactants, CCE, and turbidity.

Conclusions

The water chemistry laboratory routinely analyzes water samples for 12 substances, but only six of these are required by the drinking water standards, and 18 substances specified in the standards are seldom, if ever, done.

Laboratory records indicate that 260 water samples were analyzed last year for the above 12 substances, whereas, the water supply section indicated that there are about 1800 community water supplies in the state. About 30 of these supplies are surface water supplies and the remainder are ground water supplies fed by about (on the average) three wells. Thus, if adequate sampling had been done last year, the laboratory should have analyzed approximately 1820 samples last year.

There are no records (inventory) available to indicate when a supply was last analyzed or for what. Thus, this activity should receive top priority.

The water laboratory has no capability at the moment for running pesticides, radioactivity, or heavy metals. Since capability for radiochemical analysis is apparently available in the Division of Health Laboratory in Orlando, it is recommended that a contract be arranged with them for routine analysis of some water samples annually.

If the required metal analysis is to be undertaken another atomic absorption spectrophotometer will be required. Likewise for pesticide analysis another gas chromatograph will be required.

The water laboratory has inadequate bench, hood, storage and office space available if the additional water chemistries are to be undertaken. The available space needs to be at least doubled, and at least three more persons need to be hired to carry out the required analyses. One person will be needed for operation of the atomic absorption spectrophotometer, one to operate the gas chromatographs and the other to carry out the additional wet chemistries.

Samples for metal analysis should be preserved at the time of collection with nitric acid. Likewise, there is no point in running cyanide unless the sample has been preserved with sodium hydroxide and samples for nitrate and surfactant analysis should be preserved with mercuric chloride or else refrigerated. Since the use of these preservatives and the collection of additional samples will require many more bottles, it is recommended that non-returnable (disposable) bottles be considered. Their use eliminates a washing problem and the possibility of cross contamination.

Because of greater precision and accuracy it is recommended that the brucine rather than the phenoldisulfonic acid method be used for nitrate analysis. Likewise, the turbidimetric method for sulfates, the electrode method for fluorides, and the atomic absorption or tripyridine method for iron are recommended. If turbidity is to be done, a Hach 2100A is also recommended for this measurement.

The water analysis report form should be revised so as to include other substances in the drinking water standards, particularly metals, radioactivity, and CCE. A revised, prenumbered, sample identification form may also be desirable, particularly, if portions of the same sample are to be analyzed at more than one location.

Earl F. McFarren

SURVEY OF WATER CHEMISTRY LABORATORIES

ENVIRONMENTAL PROTECTION AGENCY
Water Supply Programs Support Activities
Water Supply Research Laboratory

Indicating conformity with the 13th edition of Standard Methods for the Examination of Water and Wastewater (1971).

Survey by Earl F. McFarren

Date December 10-11, 1973

X = Deviation U = Undetermined

O = Not Used

Laboratory Florida Division of Health

Street 1217 Pearl Street

City Jacksonville State Fla. 32201

Director Nathan Schneider

Chief Chemist Roe Hull

Water Supply Chief Glenn Dykes

Substances Determined

		Method	
1.	Physical determinations		
a.	color	Hellige comparator	
b.	odor		
c.	turbidity		0
2.	Miscellaneous anions, and organics		
a.	chlorides	Silver nitrate titration	
b.	chlorine		0
c.	cyanide	distillation	0
d.	fluorides	SPADNS (some distilled, some not)	X
e.	foaming agents	methylene blue	0
f.	nitrates	phenoldisulfonic acid	X
g.	organics - carbon adsorbable		0
h.	sulfates	Tethrahydroquinone	X
i.	other	alkalinity, hardness, TDS	
3.	Metals		
a.	arsenic	silver diethyl dithiocarbamate	0
b.	barium		0
c.	cadmium		0
d.	chromium		0
e.	copper		0
f.	iron	bipyridine	X
g.	lead		0
h.	manganese		0
i.	selenium		0
j.	silver		0
k.	sodium		0
l.	mercury		0
m.	zinc		0
n.	other		

4. Radioactivity
   a. gross alpha 0
   b. gross beta 0
   c. radium 226 0
   d. strontium 90 0
   e. other

5. Pesticides
   a. aldrin X
   b. chlordane 0
   c. dieldrin X
   d. DDT X
   e. endrin X
   f. heptachlor X
   g. heptachlor epoxide X
   h. lindane X
   i. methoxychlor X
   j. toxaphene 0
   k. cholinesterase inhibitors (carbamates and organophosphates) X
   l. 2,4 - dichlorophenoxyacetic acid X
   m. 2,4,5 - trichlorophenoxypropionic acid X
   n. other

Apparatus

	Make	Model	
6. Color comparators			
a. visual			
b. filter photometer			
7. Spectrophotometer			
a. visible	B&L	Spectronic 20	
b. flame			
c. other	Beckman	DU	
8. Atomic absorption spectrophotometer			
a. air-acetylene burner	Perkin-Elmer	306	
b. nitrous-oxide burner	"		
c. argon-hydrogen flame	"		
d. cold-vapor (flameless)	"		
9. Gas chromatographic equipment			
a. electron capture	Micro-Tek	MT220	
b. flame photometric			X
c. microcoulometric			
d. other	dual flame, Ni^{63} detectors		

Laboratory	Location	Date
Florida Division of Health	1217 Pearl Street Jacksonville, Fla. 32201	12/10-11/73

	Make	Model	
10. Other chromatographic equipment			
a. thin-layer			
b. Kuderna-Danish evaporator			
c. other			
11. Turbidimeter			0
12. Amperometer			
13. Titrimeter			
14. pH meter	Corning	Model 12	
15. Fluoride electrode			0
16. Arsine generator	have		
17. Cyanide still	have		
18. Fluoride still	have		
19. Carbon extraction equipment			
a. mini-sampler and columns			0
b. carbon drying oven and trays			0
c. soxhlet extraction apparatus			0
d. manifold for solvent evaporation			0
20. Drying oven	Precision	Model 17	
21. Steam bath			
22. Hot water bath			
23. Muffle furnace	Thermolyn	1500	
24. Distilled water still	Reverse Osmosis	Culligan (Aqua-clear)	
25. Water deionizer	mixed-bed		
26. Conductivity meter	Serfass		
27. Balance, sensitive to 0.1 mg	Christian-Becker		
28. Automatic analyzer for			
a. nitrates plus nitrites			
b. nitrites			

	Make	Model	
28. Automatic analyzer for (Continued)			
c. chloride			
d. sulfate			
e. cyanide			
f. fluoride			
g. other			
29. Radiation Counting Equipment			
a. internal proportional counter			0
b. alpha-scintillation counter			0
c. gamma spectrometer			0
d. other			
30. Other Instruments or Equipment			
a.			
b.			
c.			
d.			

Sampling

31. Containers

a. Non-reusable plastic containers preferred for the collection of samples for general inorganic analysis. . . . . . ______

b. Glass bottles with teflon lined caps preferred for collection of pesticide samples . (aluminum cap) . . . . ______

c. Other kind . 32 oz glass and 4 oz glass . . . . ______

32. Preservatives

a. Samples for metal analysis preserved by the addition of nitric acid to a pH of about 2.0 . . . HCl for iron. X

b. Nitrates and methylene blue active substances preserved by addition of mercuric chloride 0

c. Cyanide preserved by the addition of sodium hydroxide to a pH of 11. 0

d. No known or required preservative for turbidity, color, pH, chloride, sulfate, fluoride, specific conductance and total dissolved solids. . . . . ______

e. If no preservative is used, in general samples are analyzed within 72 hrs. . . . . ______

Laboratory	Location 1217 Pearl Street	Date
Florida Division of Health	Jacksonville, Fla. 32201	12/10-11/73

33. Identification
   a. Every bottle should be identified by attaching an appropriately inscribed tag, a label or a number corresponding to a sample identification sheet. . . . . ______
   b. The minimum information required on the tag or correspondingly numbered sheet includes; name of the water supply sampled, location of sampling site, exact date and time of collection, type of sample (raw, finished, grab or composite) by whom collected, and kind of preservative if added . . . . ______

34. Collection
   a. Samples from wells collected after pumping for a sufficient time to assure that the sample is representative of the ground water which feeds the well. . . . . U
   b. Finished (treated) water sampled at the plant by use of a pipeline drip device or the collecting and compositing of hourly (or other interval) samples . . . . U
   c. Distribution samples obtained at several different points in the system; usually grab samples obtained without first flushing the line, although both kinds of samples may at times be desirable. . . . . U

Records

35. Availability
   a. Assay results assembled and available for inspection X
   b. Notation made of those water supplies which did not comply with one or more standards, and some sort of follow-up program instigated . . . . ______

36. Number of Supplies		Number Analyzed Last Year	
a. individual			
b. semi-public	6,000		
c. community	1,800	260	
(1) surface			
(a) source			
(b) finished			
(c) distribution			
(2) ground			
(a) source			
(b) finished			
(c) distribution			

36. Number of Supplies (Contd) Number Analyzed Last Year

(3) mixed
- (a) source__________ ____________________ _____
- (b) finished__________ ____________________ _____
- (c) distribution________ ____________________ _____

37. Frequency
- a Physical characteristics measured at least once a week and preferably every day at the treatment plant. . . . . U
- b. Chemical characteristics determined at least once every three years on ground water supplies and semi-annually on surface water supplies unless previous data has indicated a potential problem which needs to be monitored more frequently X

Laboratory

38. Physical facilities
- a. Bench top area adequate X
- b. Sufficient cabinet space for chemicals and glassware X
- c. Adequate hood space. X
- d. Office space available for record keeping and processing reports X
- e. Space for storage and handling of bottles. . . . . _____

39. Glassware
- a. Thoroughly washed with suitable detergent and warm water . . _____
- b. Rinsed immediately in clean tap water to remove detergent . . _____
- c. Final rinse with distilled water . . . . _____
- d. Dichromate cleaning solution used for difficult to clean glassware. . . . . _____
- e. Glassware used for pesticide analysis should receive a final rinse with A. R. grade acetone or ethyl acetate . . . . . _____

40. Organization
- a. Total number of laboratories examining water__1___ . . . . _____
- b. Water laboratory is a separate unit, and not part of a food, drug, or toxicological laboratory . . . . _____
- c. Each of the other regional laboratories have the same capabilities. . . . . _____
- d. Radiation chemistry isxax is not a part of the water laboratory. _____
- e. Pesticide analysis isxax is not done in the water laboratory . . _____

Quality Control

41. Laboratory water quality
- a. Conductivity of water checked at regular intervals . . . . . . _____
- b. Use of deionized water for metal analysis . . . . _____

Laboratory Location 1217 Pearl Street Date

Florida Division of Health Jacksonville, Fla. 32201 12/10-11/73

42. Control Samples

a. A control sample of known composition (in addition to any necessary standards) is analyzed everytime one or more unknown samples are analyzed. X

b. A control sample is available and used for each substance specified in the drinking water standards X

c. A control chart has been constructed for each substance, and the precision of each determination has been calculated X

43. Reference Samples

a. Accuracy and ability of laboratory to perform each analysis checked by requiring them to analyze an unknown reference sample(s) supplied by the surveying office or laboratory at least once a year . . . . ____

Staff

44. Personnel

a. Total number of staff 2 . . . . ____

b. Number with degrees in chemistry 1 (BA) . . . . ____

c. Does state operate under a merit system . . . . ____

d. Are job descriptions written . . . . ____

e. Does state encourage attendance at professional meetings, short courses, etc . . . . ____

45. Salaries

a. Chief chemist $14,560 . . . . ____

b. Assistant chemist ________ . . . . ____

c. Aides none . . . . ____

APPENDIX F

WATERBORNE DISEASE OCCURRENCE

Since the middle of the nineteenth century, when Dr. John Snow did his classical study on the transmission of cholera through a water supply, it has been generally recognized that disease epidemics can, and do, result from consumption of water containing pathogenic microorganisms. Diseases most commonly associated with drinking water are typhoid fever, dysentery, gastroenteritis, and infectious hepatitis. Spread of these diseases usually occurs when body wastes from the infected persons are ingested. While person-to-person contact is recognized as the most probable method of transmission for low incidence levels currently found in this country, the potential for catastrophic epidemics transmitted by drinking water supplies serving thousands of people remains.

Human body wastes, when present in inadequately treated drinking water, have caused waterborne outbreaks in Florida. Fortunately, none of the recent outbreaks have resulted in a fatality.

The best documented and most publicized outbreak occurred in February and March 1973 at the South Dade Migrant Farm Labor Camp, Dade County. Two hundred ten (210) probable and confirmed cases occurred, and at least 170 people were hospitalized. Epidemiological investigation suggested a common source and pointed to the Camp's water supply. An engineering evaluation revealed multiple potential avenues for contamination of the water system through inadequate system safeguards.

A contaminated water supply infected 40 people with gastroenterities and forced temporary closing of Oscar Sherer State Park in Sarasota County in May 1972. The Sarasota County Health Officer said the apparent cause was a malfunctioning in drainage and chlorination equipment. Bacteriological tests subsequent to the outbreak confirmed the presence of contamination.

While epidimiological records do not generally show widespread incidence of waterborne disease, this may reflect incomplete reporting, inaccurate or unspecific diagnosis, and the fact that much enteric illness is not treated by physicians. In light of these factors, some health authorities suggest that the actual incidence of diseases such as gastroenteritis and infectious hepatitis may be as high as 100 times the level of cases reported.

After reviewing waterborne disease data over the last three decades, Craun and McCabe* report that outbreaks are no longer on the decline in the United States. The consistent pattern of decrease in the number of waterborne outbreaks recorded in the period 1938-1955 has reversed and since 1955 a slight increase has occurred. Whether this apparent trend represents a real increase or is due to improved diagnosis and reporting is not fully known. It is significant, however, that there appears to be no decline, and if similar conditions continue in water supply practice, the current average of one outbreak per month can be expected to continue.

* "Review of the Causes of Waterborne Disease Outbreaks", presented AWWA Annual Meeting, Denver, Colorado, June 1971.

Table I presents a tabulation of the more commonly occurring diseases which may be waterborne. Also presented is a comparison of the number of cases occurring in Florida versus the number occurring nationwide for the past ten years. While Florida has approximately 3.6 percent of the nation's population, it has the following percentages of the country's reported cases for the period 1963-72:

a) Amebiasis - 1.0 percent

b) Hepatitis - 2.3 percent

c) Salmonellosis - 6.9 percent

d) Shigellosis - 4.3 percent

e) Typhoid - 3.2 percent

The data presented here does not imply that any or all reported cases were waterborne. A portion of these cases, however, plus other unreported cases, may have been waterborne. In addition, the data shows a reservoir of infection in the population which presents a continuous potential to contaminate water supplies and cause recurrence of the great epidemics of the past.

In essentially all documented cases of waterborne illness, it has been shown that definite deficiencies existed in the water supply systems during the time when disease was transmitted. Furthermore, these deficiencies were either unrecognized because of inadequate surveillance or were otherwise not remedied. Deficiencies similar to those believed responsible for past epidemics still are found in the water supplies of Florida. With deficient water supplies and diseased individuals documented, greater vigilance by public health officials and the water supply industry is needed to minimize risk of waterborne disease.

In recent years, concern has also been directed to the possible chronic or acute diseases which may result from use of water containing certain chemicals. These potentially dangerous chemicals include heavy metals, pesticides, and other toxic industrial products. Few clinical cases of illness from chemicals in drinking water are recorded. This lack of documentation is not surprising since affected individuals may have unrecognized symptoms and health agency statistics are usually limited to communicable diseases. In view of increased reuse of water by municipal, agricultural and industrial users, the potential for chemical contamination must be recognized and reacted to with increasingly vigorous chemical surveillance.

TABLE I

REPORTED INCIDENCE OF SELECTED DISEASES IN FLORIDA 1963 1972

Year	Amebiasis	Hepatitis	Salmonellosis	Shigellosis	Typhoid
1963					
Reported Fla. Cases	42	629	947	437	17
Reported U. S. Cases	2,886	42,974	15,390	13,009	566
Percent in Fla.	1.5	1.5	6.2	3.4	3.0
1964					
Reported Fla. Cases	22	790	1,099	586	19
Reported U. S. Cases	3,304	37,740	17,144	12,934	501
Percent in Fla.	0.7	2.1	6.4	4.5	3.8
1965					
Reported Fla. Cases	31	803	1,295	513	6
Reported U. S. Cases	2,768	33,856	17,161	11 027	454
Percent in Fla.	1.1	2.4	7.6	4.7	1.3
1966					
Reported Fla. Cases	46	653	1,166	778	11
Reported U. S. Cases	2,921	32,859	16,841	11,888	378
Percent in Fla.	1.6	2.0	6.9	6.5	2.9
1967					
Reported Fla. Cases	39	639	1,121	531	11
Reported U. S. Cases	3,157	38,909	18,120	13,474	396
Percent in Fla.	1.2	1.6	6.2	3.9	2.8
1968					
Reported Fla. Cases	22	1,149	1,226	535	21
Reported U. S. Cases	3,005	45,893	16,514	12,180	395
Percent in Fla.	0.7	2.5	7.4	4.4	5.3
1969					
Reported Fla. Cases	34	1,434	1,678	569	13
Reported U. S. Cases	2,915	48,416	18,419	11,946	364
Percent in Fla.	1.2	3.0	9.1	4.8	3.6
1970					
Reported Fla. Cases	21	1,862	1,350	495	13
Reported U. S. Cases	2,888	56,797	22,096	13,845	346
Percent in Fla.	0.7	3.3	6.1	3.6	3.8
1971					
Reported Fla. Cases	12	2,191	1,517	538	13
Reported U. S. Cases	2,752	59,606	21,928	16,143	407
Percent in Fla.	0.4	3.7	6.9	3.3	3.2
1972					
Reported Fla. Cases	23	2,459	1,466	863	10
Reported U. S. Cases	2,199	54,074	22,151	20,207	398
Percent in Fla.	1.0	4.6	6.6	4.3	2.5
Totals 1963-72					
Reported Fla. Cases	292	12,609	12,865	5,827	134
Reported U. S. Cases	28,795	451,124	185,764	136,703	4,205
Percent in Fla.	1.0	2.8	6.9	4.3	3.2

APPENDIX G

Bone Valley Phosphate Region Radiation

The Bone Valley Phosphate Region of Florida covers substantial portions of Polk, Hardee, Manatee, Hillsboro, and DeSoto counties. Uranium occurs naturally in this phosphate rock, and Radium-226 is a radioactive decay product of this uranium. Radium has been shown to accumulate in human bone structure, and for this reason is considered especially hazardous when present in material that may be ingested.

Small public water supplies in Polk County were selected to be surveyed and sampled as part of the Florida Water Supply Program Evaluation. Since much of Polk County lies in the Bone Valley Region, it was decided that samples for radio-chemical analysis should be collected in addition to the bacteriological and trace metals samples routinely collected for all small public supplies surveyed in the State.

Twenty-three (23) small public supplies were sampled throughout the county. (See Appendix B for complete details.) The Federal Drinking Water Standards establish that when Radium-226 exceeds 3 pC/l, the total radiation from all sources should be assessed and judged by the Radiation Protection Guides of the Federal Radiation Council. New EPA Drinking Water Standards currently under preparation are expected to revise the radiation section extensively, with the general thrust being toward more stringent limits. Eight (8) of the 23 small public supplies sampled in Polk County showed Radium-226 in excess of 3 pC/l. Three of these systems had Radium-226 concentrations above 10 pC/l.

A number of studies in recent years have investigated the Bone Valley Phosphate Region and associated environmental radiation. The most recent was issued by the National Field Investigations Center, Environmental Protection Agency, Denver, Colorado, entitled "Radiochemical Pollution from Phosphate Rock Mining and Milling". Included as an appendix in this report is "Draft Report on Radium-226 and Radon-222 Concentrations in Central Florida Ground Waters", by S. David Shearer, Bradford Smith, and D. E. Rushing. Both of these studies report levels of Radium-226 exceeding 3 pC/l in certain well water in Polk County and vicinity.

Both of the studies above recommended that further study be undertaken to better define the possible hazard to health from radiation in this region. It was further recommended in the Shearer, Smith and Rushing study that corrective measures be taken on those supplies whose radiation levels would expose residents to radiation exceeding Range II of the Federal Radiation Council Guides.

Based on the findings and recommendations of the earlier studies referenced above and corroborated by the sampling conducted in this evaluation, it is recommended that:

1. Surveillance of radiation levels in drinking water be resumed by the Florida Division of Health, with emphasis on public and small public supplies located in known areas of elevated radioactivity.

2. Additional monitoring be conducted of water supplies whose Radium-226 level exceeds 3 pC/l.

3. If it is determined that supplies consistently exceed safe limits, corrective action or alternate source should be required by the Florida Division of Health to attain acceptable levels.

4. Existing and new data be assembled and analyzed to determine which portions of the Bone Valley Region and which aquifers are likely to yield high radiation waters.

APPENDIX G

TABLE I

POLK COUNTY RADIOLOGICAL SAMPLING RESULTS

Establishment	Community	Ra-226 pC/1*	Source	Well Depth	Residents** Served/year
Beasleys Trailer Park	Lakeland	4.9 ± 1%	Well	100'	12
Campin' Aires Camp Grounds	Lake Wales	3.7 ± 2%	Well	450'	-
Copper Top Restaurant	Lake Wales	0.23 ± 8%	Well	405'	-
Dicks Trailer Park and Restaurant	Mulberry	0.19 ± 9%	Well	168'	6
Doris' Play School	Mulberry	0.18 ± 9%	Well	97'	20
Edds Trailer Park	Auburndale	2.8 ± 2%	Well	110'	24
Fish Haven Lodge	Auburndale	1.5 ± 3%	Well	150'	3
Fletcher Trailer Park & Fishing Camp	Haines City	2.4 ± 3%	Well	125'	18
Gibsons Trailer Park	Lakeland	3.5 ± 2%	Well	156'	57
Hall's Trailer Park	Mulberry	1.9 ± 1%	Well	258'	18
Illinois Trailer Park	Lakeland	2.3 ± 2%	Well	82'	21
KOA Camp Grounds	Lake Wales	7.3 ± 1%	Well	705'	-

APPENDIX G

TABLE I - CONTINUED

POLK COUNTY RADIOLOGICAL SAMPLING RESULTS

Establishment	Community	Ra-226 pC/1*	Source	Well Depth	Residents** Served/year
Lake Wales Motel and Restaurant	Lake Wales	3.4 ± 2%	Well	700'	-
McGrady's Trailer Park	Frostproof	5.2 ± 1%	Well	220'	24
Palmer Trailer Park	Lakeland	0.77 ± 1%	Well	123'	12
Pasco's Labor Camp	Lake Hamilton	1.7 ± 4%	Well	320'	-
Robarts Mobile Home Park	Frostproof	10.6 ± 1%	Well	200'	24
Sandy Cove Trailer Park	Babson	14.7 ± 1%	Well	800'	36
Schoupp Trailer Park	Lakeland	1.2 ± 3%	Well	-	15
Spivey's Trailer Park	Eaton	1.7 ± 4%	Well	206'	21
Stan's Trailer Park	Lakeland	1.8 ± 2%	Well	135'	21
Youngs Ridge Trailer Park	Lakeland	15.3 ± 1%	Well	180'	30
Youngs Labor Camp	Gordonville	1.2 ± 3%	Well	250'	-

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* pC/1 = pica Curies per liter.

** A dash indicates few or no persons reside at establishment on year-round basis.